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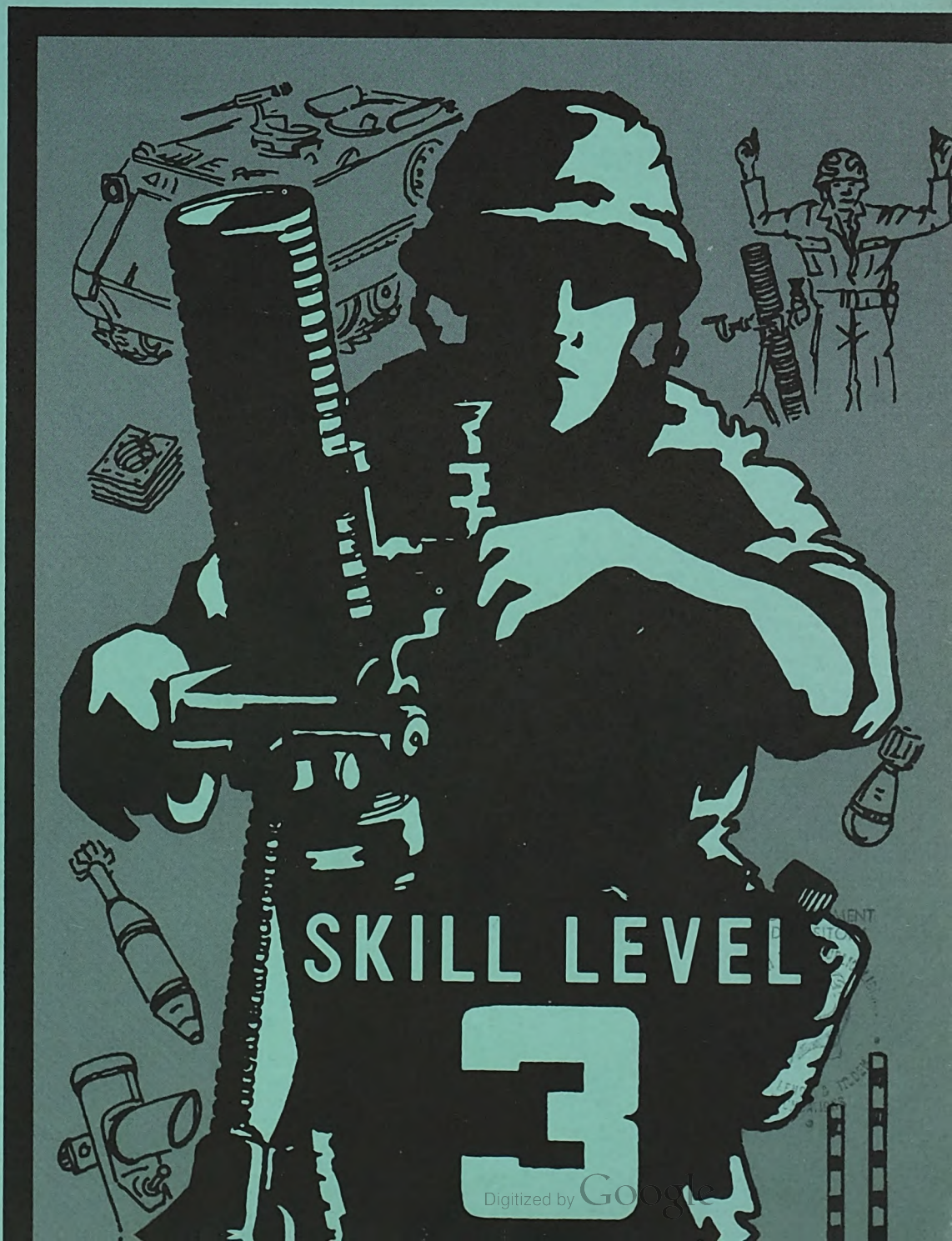
SOLDIER'S MANUAL

11C30- INDIRECT FIRE INFANTRYMAN



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1 United States.
2 War Dept.
Field Manuals.

COMMANDERS ATTENTION

Distribute this manual to each soldier in MOS 11C skill levels 2 - 4.

The Soldier's Manual is designed to tell the soldier what tasks he must be proficient in to be MOS qualified. If the soldier follows the road map it provides, he should progress readily to positions of responsibility commensurate with his aptitude and motivation.

Initial distribution of Soldier's Manuals will be "pushed" down to the unit level, based upon assigned strength in the particular MOS and skill level. In the event additional manuals are needed by the unit for MOS study, libraries or other training needs, DA Form 17 (Request for Publications) may be sent directly to the US Army Publications Center, 2800 Eastern Boulevard, Baltimore, Maryland 21220.

The individual soldier is responsible for retaining and maintaining his manual. Soldier's Manuals are designed on the modular system. Each skill level manual builds upon the other. As an example, a skill level 3 soldier needs manuals 1 through 4. Levels 1 through 3 tell the level 3 soldier what he needs to know for proficiency at this present skill level. The skill level 4 manual tells him what he must be able to do at the next skill level. The point is - he needs all 4 manuals to know all he needs to know.

Upon promotion to grades E5, E6, E7, or E8, the soldier must order his next higher level manual directly from the preparing agency identified in this manual.

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D...Q

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RESERVE COMPONENTS

ARMY NATIONAL GUARD—ARMY RESERVE

This page is information for you the Reserve Component soldier. This Soldier's Manual, as published, is representative of the critical tasks to be performed by the Active Army soldier in your MOS on equipment available in the Active Army inventory.

***Most tasks* in this manual *are applicable to you* without changes. However, some tasks may require modification due to differences of equipment, facilities and training time available to you.**

By now, you are probably wondering why this special page. This is to inform you that due to time constraint, this soldier's manual has not undergone a review process necessary to make it equitable to you the Reserve Component soldier. In the meantime, you will be using this manual along with your Active Army counterpart. Future publications of soldier's manuals will undergo the necessary review process. This manual will be included in that review and if applicable, change sheets will be published and distributed to you.

Many tasks that you learned in BCT and AIT are in this manual. There are other critical tasks that you are responsible to learn on your own. Training references/materials are available and can be provided to you through your unit. This is where your initiative comes into play. It is to your advantage to take the initiative NOW. Your performance in your duty position will be based on your ability to perform all the critical tasks for which you are accountable.

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SOLDIER'S MANUAL

11C30 - INDIRECT FIRE INFANTRYMAN
Skill Level 3

The new Table of Contents, Introduction, and Tasks contained in this document provides for upgrading and updating FM 7-11C2 to form FM 7-11C3 for Skill Level 3 soldiers (E-6s).

FM 7-11C2, 30 July 1976, is updated as follows:

1. **Remove the following from FM 7-11C2:**

   Front Cover
   Table of Contents ..... Pages I, II, & III

2. **Insert the following pages as indicated below:**

MAJOR AREA	ADD PAGES	AFTER PAGE
Front Cover - SL3	N/A	N/A
Table of Contents - SL3	Pages I, II, & III	Cover
SL3 Introduction and Road Map	Section III Divider thru 1-III-B-14	1-II-B-12
Nuclear, Biological, and Chemical	2-I-B-9 thru 2-I-B-15.2	2-I-B-8.9
Individual Fitness	2-I-C-2 thru 2-I-C-2.5	2-I-C-1
Land Navigation	2-II-D-12 thru 2-II-D-16.2	2-II-D-11.1
Hand Grenades, Mines, and Demolitions	2-III-E-6 thru 2-III-E-7.1	2-III-E-5.1
Computing		
A. M16 Plotting Board	2-V-A-8 thru 2-V-A-8.1	2-V-A-7.2
B. Firing Chart	2-V-B-6 thru 2-V-B-8.14	2-V-B-5.2
Communications		
A. Radio	2-VI-A-10 thru 2-VI-A-10.4	2-VI-A-9.6
B. Telephone	2-VI-B-3 thru 2-VI-B-4.1	2-VI-B-2.2
Mortar Gunnery	2-VIII-E-7 thru 2-VIII-E-11	2-VIII-E-6.1

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Leadership and Training

A. Leadership ..... **2-IX-A-5 thru 2-IX-A-5.6** **2-IX-A-4**

B. Training ..... **2-IX-B-2 thru 2-IX-B-2.2** **2-IX-B-1.1**

3. File this change sheet in front of the publication for reference purposes. The proponent agency of this field manual is the United States Army Infantry School. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to Commandant, United States Army Infantry School, ATTN: ATSH-I-V-IT, Fort Benning, Georgia, 31905.

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FM 7-11C3
HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 30 July 1976

SOLDIER'S MANUAL
INDIRECT FIRE INFANTRYMAN SKILL LEVEL 3

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CHAPTER 1

INDIRECT FIRE INFANTRYMAN

SECTION III
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INTRODUCTION AND ROAD MAP

FM 7-11C3

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HOW TO USE THE SOLDIER'S MANUAL

The Soldier's Manual for Skill Level 3 soldiers (grade E6) contains basic combat tasks that all 11C30 Indirect Fire Infantrymen must be able to perform. These tasks are listed on the Road Map for Skill Level 3 under "BASIC TASKS FOR ALL SKILL LEVEL 3 INDIRECT FIRE INFANTRYMEN." The Road Map will tell you the page on which each task can be found.

MANDATORY TASKS

Tasks that are marked "MANDATORY" will receive priority in training and will be tested on the Skill Qualification Tests. Additional mandatory tasks may be added later.

ADDITIONAL TASKS FOR SELECTED DUTY POSITIONS

Your duty position may require you to be able to do some add-on tasks. The table below lists the duty positions which require add-on tasks and the number of add-on tasks required. A list of tasks for each duty position and the page on which each task can be found are listed on the Road Map for Skill Level 3 under "ADDITIONAL TASKS FOR SELECTED DUTY POSITIONS."

DUTY POSITION	NUMBER OF TASKS
81-mm Mortar Section Leader (Ground)	29
81-mm Mortar Section Leader (Carrier)	36
Fire Direction Chief (Ground)	31
Fire Direction Chief (Carrier)	41

Refer to the Introduction to Skill Level 1, pages 1-I-A-5, 6, and 7, for an explanation of the Training and Evaluation outline.

At skill level one and two, you were concerned with individual tasks and tasks associated with other members of the Indirect Fire Team. These tasks were aimed at qualifying you as a member of one of the elements of the Indirect Fire Team. As an FDC chief or section leader you are now responsible for the actions of all elements of the Indirect Fire Team. At skill level three, you are given tasks which test your ability to lead; your responsibilities become more complex at this level. You not only must be aware of what others are doing, you must CONTROL their collective actions. You are expected to master these combat skills, to train others to a high degree and to insure that the skills are applied in combat.

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A NOTE TO TRAINERS

Today, we are concerned with training combat leaders who are prepared to win the First Battle of the Next War. We must seek personalities which are knowledgeable in their individual jobs, the jobs of their subordinates and those who can lead men; these are the type personalities who will receive leadership positions. In order to do this, FDC chiefs and section leaders must build clear word pictures and issue specific instructions. NOTHING SHOULD BE LEFT TO CHANCE OR DOUBT.

The job of an FDC chief or section leader is one of the most difficult on the battlefield, therefore, we must simplify as much as possible; this is where cross-training and the team system will relieve the FDC chief or section leader of a majority of his problem of battlefield explanation. Through cross-training and the team system a more efficient running organization will be created.

To make a decision -- while engaged with an enemy -- to locate an enemy -- to attack targets -- to properly use terrain -- to control elements -- to inspire men -- to keep the element's aggressive spirit alive is challenge enough for any man. However, the challenge is a real one. It must be approached with all of the enthusiasm and dedication one can muster. Your unit's training program should be based on how well you, your FDC, FOs and squad leaders can perform the combat tasks contained in the Soldier's Manuals. After you have determined your own proficiency level and that of your FDC, FOs and squad leaders, you must train in the areas of poor performance first.

A basis for evaluating your unit training is the ARTEP. It sets forth the missions which the Indirect Fire Team must perform in combat and identifies the skills associated with these missions. The ARTEP establishes the MINIMUM ESSENTIAL STANDARDS that the Indirect Fire Team must achieve in training if they are to FIGHT and to WIN on the MODERN BATTLEFIELD.

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HOW TO MAKE SERGEANT FIRST CLASS E7

The Army will only promote men who have proved that they can do the job. In other words, you must show that you can do the tasks required of a Sergeant First Class before you can be considered for promotion to that grade. Here is how the system works:

1. LEARN THE TASKS IN THIS MANUAL that apply to you. As soon as you have done that, ask for a copy of FM 7-11C4 Soldier's Manual (for Skill Level 4).

2. Then LEARN THE BASIC TASKS IN THE SKILL LEVEL 4 MANUAL. There will not be as much new material as you might think since many of the skills that you learned for Skill Level 3 will also be in the Skill Level 4 manual.

3. As an E6, you will TAKE A SKILL QUALIFICATION TEST (SQT). The SQT will test your ability to do the tasks in the Soldier's Manual. If you make a high enough score on the test, you will be given the Skill Level 4 rating which you must have before you are promoted to E7. Since the SQT will use the same conditions and standards used in the Soldier's Manual, you will be able to prepare in advance for the SQT.

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4. The SQT has three parts: written, hands-on, and task certification. Sixty to ninety days before the SQT is given, an SQT notice will be sent to each unit. It will tell which tasks will be tested in each part of the SQT. It will also tell how the task will be tested. There are three different ways to test a task. First, you may be asked to answer a **written question** about how a task is performed. You will pick the correct answer from a list of answers and mark the correct answer on a machine-scoreable answer sheet. Second, you may be asked to actually do the task. For example, you may be given an M72A2 LAW and be asked to prepare it for firing. This is called a **"hands-on" test** which means you are actually required to do the task as you would on the job. Third, your unit commander may observe your performance of a task and report your ability to perform it as part of your SQT score. Your performance on all three parts of the test will be reported to you sometime soon after you complete the SQT. You will be told on which tasks you did not perform well. You can use your Soldier's Manual to improve your performance in those areas.

5. Also while you are an E6, you may ATTEND THE ADVANCED NONCOMMISSIONED OFFICER'S COURSE (ANCOC). In this course, you will build on the skills you developed during unit training and gain leadership experience to help you perform more effectively.

6. In addition to the SQT, you will RECEIVE AN ENLISTED EFFICIENCY REPORT (EER). In the EER, your supervisor will give his opinion of your performance on the job. Both the SQT and the EER will be used to determine your final evaluation score.

7. If you don't understand any parts of the manual or want to know more about advancement opportunities, see your platoon sergeant. Take advantage of his knowledge and experience.

8. At the top of your enlisted chain of command is your sergeant major. He is an expert in helping younger soldiers learn about training, evaluation, and the system for getting ahead in the Army. As such, he is responsible for insuring that your NCOs either provide the assistance you need or refer you to him for his guidance and help.

9. The Army wants and needs well-trained soldiers who desire to advance through the ranks. This manual and the willing assistance of senior NOCs are the tools you can use to your advantage and the Army's.

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ROAD MAP
for
INDIRECT FIRE INFANTRYMAN SKILL LEVEL 3

BASIC TASKS FOR ALL SKILL LEVEL 3 INDIRECT FIRE INFANTRYMEN

Battlefield Survival

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FIRST AID	
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NUCLEAR, BIOLOGICAL, AND CHEMICAL	
Maintain protective mask and accessories.	2-I-B-1
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Camouflage/conceal equipment. 2-II-A-2

Camouflage/conceal defensive positions. 2-II-A-3

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Construct individual defensive positions. 2-II-A-5

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COMPUTING

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Maintain 81-mm mortar and associated fire control equipment.	2-VIII-B-6
Remove a misfire from the 81-mm mortar.	2-VIII-B-7
Engage target using fire without FDC.	2-VIII-B-8
Refer sight and realine aiming posts.	2-VIII-B-9
Reciprocally lay mortar using M2 aiming circle and place out aiming posts.	2-VIII-B-10
Manipulate mortar for traversing and searching fires.	2-VIII-B-11
Adjust fire without an FDC.	2-VIII-E-1
Lay 81-mm mortar for direction using direct alinement method (fire without FDC).	2-VIII-E-2
Lay mortar for direction using M2 aiming circle.	2-VIII-E-3

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Lay mortar for direction using M2 compass (carrier-mounted).	2-VIII-E-5
Supervise squad during the conduct of fire.	2-VIII-E-6
Prepare M16 plotting board for operation.	2-V-A-3
Determine initial firing data and process subsequent FO corrections.	2-V-A-4
Determine data for sheaf adjustment.	2-V-A-5
Determine data for re-registration and application of corrections.	2-V-A-6
Record information on firing data sheet.	2-V-A-7
Prepare FDC order.	2-V-A-8
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Drive an APC with night vision devices, infrared equipment, and blackout drive.	2-VII-B-3
Operate an APC in water.	2-VII-B-4
Start the APC engine using auxiliary power.	2-VII-B-5
Perform a tracked vehicle ESC inspection.	2-VII-B-6
Maintain required TAMMS records on a tracked vehicle.	2-VII-B-7
Perform operator maintenance on an APC.	2-VII-B-8
Maintain caliber .50 machinegun and ammunition.	2-III-F-1
Load, reduce a stoppage, unload, and clear a caliber .50 machinegun.	2-III-F-2
Engage targets with a caliber .50 machinegun.	2-III-F-3
Set headspace and timing on a caliber .50 machinegun.	2-III-F-4
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Boresight an AN/TVS-2 to caliber .50 machinegun.	2-III-F-7

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107-MM (4.2-INCH) MORTAR FDC CHIEF (GROUND-MOUNTED)

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Maintain 107-mm (4.2-in) mortar and equipment.	2-VIII-C-6
Remove a misfire from the 107-mm (4.2-in) mortar.	2-VIII-C-7
Refer sight and realine aiming posts.	2-VIII-C-8
Reciprocally lay mortar using M2 aiming circle and place out aiming posts.	2-VIII-C-9
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Maintain 107-mm (4.2-in) mortar and equipment. 2-VIII-D-6

Remove a misfire from the 107-mm (4.2-in) mortar. 2-VIII-D-7

Refer sight and realine aiming posts. 2-VIII-D-8

Reciprocally lay mortar using M2 aiming circle and place out aiming posts. 2-VIII-D-9

Manipulate mortar for traversing fires. 2-VIII-D-10

Engage target using fire without FDC. 2-VIII-D-11

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Adjust fire without an FDC.	2-VIII-E-1
Lay 107-mm (4.2-in) mortar for direction using direct alinement method (fire without FDC).	2-VIII-E-2
Lay mortar for direction using M2 aiming circle.	2-VIII-E-3
Lay mortar for direction using M2 compass (carrier-mounted).	2-VIII-E-4
Supervise squad during the conduct of fire.	2-VIII-E-5
Prepare firing chart for operation.	2-V-B-1
Determine firing data and process subsequent FO corrections.	2-V-B-2
Determine data for sheaf adjustments.	2-V-B-3
Determine data for re-registration and application of corrections.	2-V-B-4
Record information on firing data sheet.	2-V-B-5
Prepare FDC order.	2-V-B-6
Record meteorological (MET) data using MET data sheet.	2-V-B-7
Determine and apply MET firing corrections.	2-V-B-8
Drive an APC cross-country.	2-VII-B-1
Drive an APC on roads, in vehicle parks, and in built-up areas.	2-VII-B-2
Drive an APC with night vision devices, infrared equipment, and blackout drive.	2-VII-B-3
Operate an APC in water.	2-VII-B-4
Start the APC engine using auxiliary power.	2-VII-B-5
Perform a tracked vehicle ESC inspection.	2-VII-B-6
Maintain required TAMMS records on a tracked vehicle.	2-VII-B-7
Perform operator maintenance on an APC.	2-VII-B-8
Maintain caliber .50 machinegun and ammunition.	2-III-F-1
Load, reduce a stoppage, unload, and clear a caliber .50 machinegun.	2-III-F-2
Engage targets with a caliber .50 machinegun.	2-III-F-3

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Set headspace and timing on a caliber .50 machinegun. 2-III-F-4

Target/confirm targeting on a caliber .50 machinegun. 2-III-F-5

Mount/dismount an AN/TVS-2 sight on caliber .50 machinegun. 2-III-F-6

Boresight an AN/TVS-2 to caliber .50 machinegun. 2-III-F-7

Maintain auxiliary generator on M577 tracked vehicle. 2-VII-B-9

Install/operate auxiliary generator on M577 tracked vehicle. 2-VII-B-10

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TRAINING AND EVALUATION OUTLINE

TASK

DECONTAMINATE UNIT EQUIPMENT

EVALUATION

CONDITIONS:

In a field location, wearing field clothing and protective mask, carrying individual weapon, M13 decontamination kit, and any of the following decontaminants: STB, soap and water, DS2 1½-quart decontaminating apparatus, and rags, broom or swab; with a requirement to decontaminate squad equipment.

STANDARDS:

1. Tactical vehicles - decontaminate vehicles with DS2, soapy water, solvents, or slurry.

2. Weapons and ammunition - same as 1 above.

3. Optical equipment - decontaminate by blotting with rags, wiping with an organic solvent, and then allowing them to air.

4. Communication equipment - same as 1 through 3 above.

TRAINING:

1. Decontamination materials and their uses (figures 1 thru 3).

a. ABC - M13 individual chemical decontaminating kit.

(1) How used. The M13 kit is used by the individual for limited decontamination of his person, clothing, and equipment.

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(2) Action. Skin pad removes liquid chemical contamination from the skin by absorption. The cloth bags neutralize small droplets and vapors of chemical agents on clothing and equipment by chemical action. A dye capsule in the bag, when crushed and kneaded into the chemical in the bag, indicates liquid chemical agent contamination if a red to brownish-red color develops.

WARNING: Do not allow any of the powder from the skin pad or cloth bag to enter the eyes or mouth. Wear protective mask and gloves when using the cloth bag. After decontaminating the hands, wear protective gloves when using the cloth bags for decontaminating clothing and equipment.

Figure 1. Decontaminating apparatus, portable, DS2, 1½-quart, ABC-M11.

Figure 2. Decontaminating agent, STB packaged in an 8-gallon drum.

Figure 3. Antiset, decontaminating slurry, M2.

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b. STB decontaminating agent (bleach).

(1) How used. STB can be applied undiluted but should be used either as a dry mix (with earth) or as a wet mix (with water). It should not be left on contaminated surfaces for longer than 24 hours because it corrodes metals.

(2) Action. STB neutralizes liquid chemical agents by chemical action. Undiluted bleach in direct contact with liquid blister agents reacts violently and can cause flame and heavy vapor. STB is chemically active, causing vigorous corrosion of metals. Wet mix is effective against biological agents.

WARNING: DO NOT USE FOR PERSONNEL DECONTAMINATION. DO NOT MIX WITH DS2 BECAUSE A FIRE MAY RESULT. Wear protective mask and gloves when handling STB.

c. DS2 decontaminating agent.

(1) How used. Ready-to-use solution is available in 1 ½-quart cans and 5-gallon drums. DS2 can be applied easily with the 1½-quart decontaminating apparatus, a broom, or a swab. One application of DS2 should be made to the contaminated surface and after 30 minutes, flushed with water. The solution is effective at temperatures from -15° to 125° F.

(2) Action. DS2 neutralizes all known chemical agents and most biological agents. It reacts with G-agents, V-agents, and blister agents to reduce their hazards within 30 minutes after application.

WARNING: DO NOT USE FOR PERSONNEL DECONTAMINATION. DO NOT MIX WITH STB BECAUSE A FIRE MAY RESULT. Avoid inhalation of vapors or contact of solution with the skin or eyes. Wear protective mask when using DS2. Because DS2 is flammable, the 1½-quart decontaminating apparatus must not be confused with a fire extinguisher.

d. BPL biological decontaminant.

(1) How used. Normally, 1 gallon of BPL is required to decontaminate each 25,000 cubic feet (708 cubic meters) of space. BPL can be disseminated as an aerosol from a variety of devices. Recommended disseminators are:

(a) Sprayer, insecticide, pushcart-mounted, mist-type gasoline-driven, 30 gph.

(b) Sprayer, insecticide, skid-mounted, fog, gasoline-driven, 40 gph.

(2) Action. BPL destroys microorganisms, including bacterial spores.

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WARNING: DO NOT USE FOR PERSONNEL DECONTAMINATION. BPL is toxic to man. Avoid repeated exposure to subirritating concentrations of BPL vapor. Personnel decontaminating the interior of buildings wear special-purpose masks, protective masks, or self-contained breathing apparatus and protective clothing.

e. Washing soda (Sodium Carbonate).

(1) How used. A solution is made by stirring 2 pounds of washing soda into 2½ gallons of water; it is then applied to contaminated surfaces.

(2) Action. It neutralizes most chemical agents and is especially effective against G-agents. It is used as a washing agent against blister agents and irritant agents.

WARNING: DO NOT USE FOR PERSONNEL DECONTAMINATION.

f. Caustic soda (Lye).

(1) How used. A 5 percent solution is made by stirring 1 pound of lye into 2½ gallons of water; it is then applied to contaminated surfaces.

(2) Action. It neutralizes chemical agents and biological agents. It is especially effective against G-agents. Decontamination is faster with concentrated solutions.

WARNING: DO NOT USE FOR PERSONNEL DECONTAMINATION. Both solid and solution damage skin, eyes, and clothing. Caustic soda corrodes metal surfaces, especially aluminum. Personnel handling caustic solutions should wear protective masks.

g. Fuels and solvents.

(1) How used. Fuel is applied to contaminated surfaces and ignited. Solvent (like gasoline, kerosene, or carbon tetrachloride) is applied with swabs, taking care not to spread contamination.

(2) Action. Ignited fuel destroys agents; solvents merely remove them, but sufficient solvents can dilute most dangerous contamination.

WARNING: Do not inhale fumes of solvents for prolonged periods. Dangerous vapor concentrations that create a downwind hazard may be set up during burning.

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h. Water or steam.

(1) How used. Water or steam is applied under high pressure; action of hot water is speeded by using soap or other detergent.

(2) Action. It removes dirt or grease containing chemical agents or radioactive material. Hot soapy water destroys G-agents and physically removes other chemical and radiological contamination.

WARNING: Water and condensed steam are drained into a sump and properly marked. If necessary to drain into a stream, friendly units downstream must be notified.

(3) Soap and water. Soap and water, preferably hot, can be used with other decontaminating materials or used alone for removal of chemical contamination from clothing or equipment.

i. Hot air.

(1) How used. Hot air is used in special situations, such as decontamination of delicate instruments contaminated with liquid agents or decontamination of aircraft cabins by engine heaters.

(2) Action. It evaporates liquid chemical contaminants.

CAUTION: Temperature and air velocities used should be safe for particular equipment involved. Effluent air will be contaminated.

j. Weathering. Exposure of chemically contaminated equipment to the sun, air, and rain will decontaminate the equipment if sufficient time is allowed.

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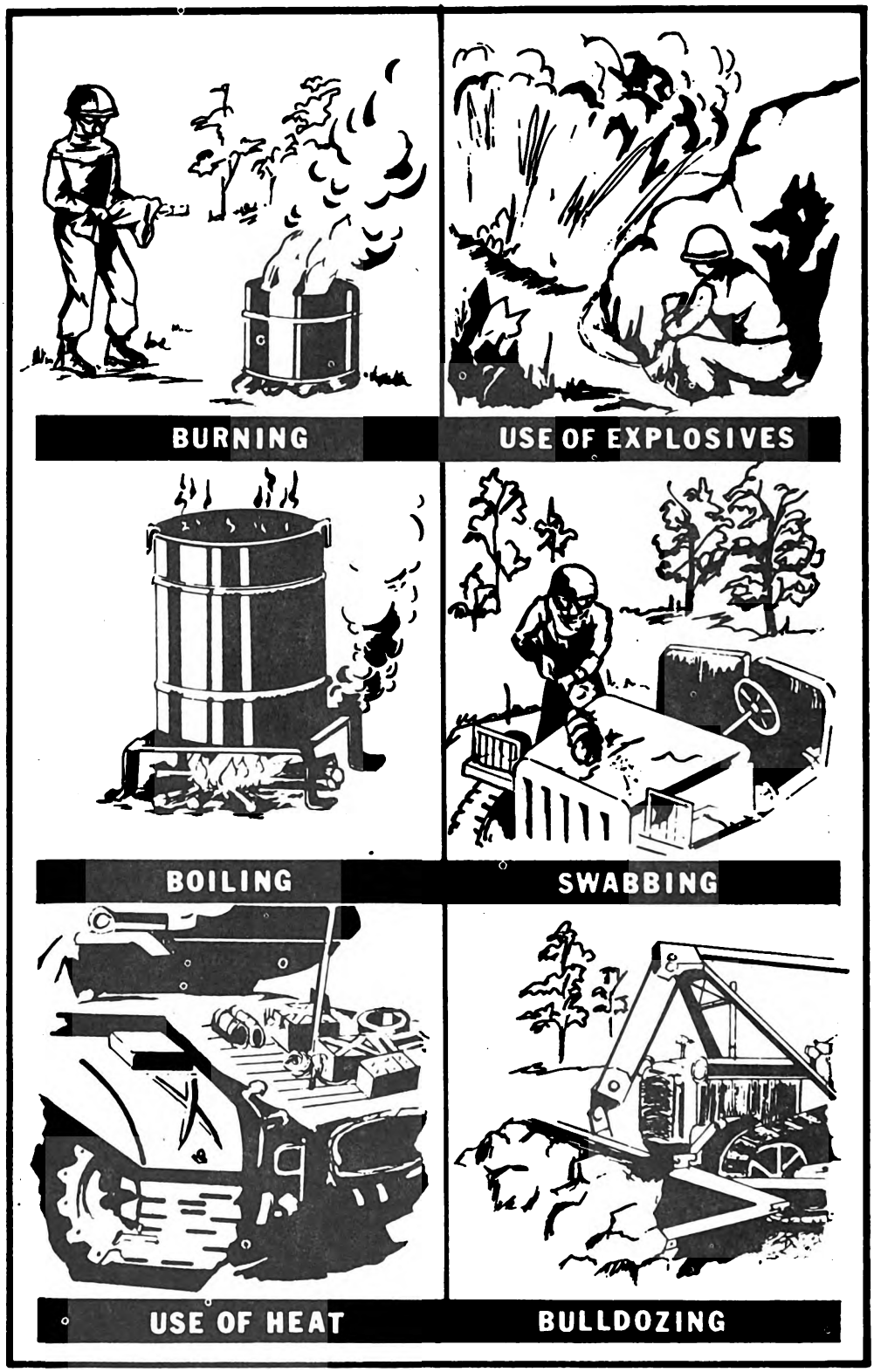

Figure 4. Field expedient methods of decontamination.

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2. Chemical decontamination of unit equipment. Unit equipment used by individuals is decontaminated by individuals, as soon after contamination as the situation permits, as described below.

a. Vehicles. Vehicles that are lightly contaminated (pinhead-size spots at least one-fourth inch apart), as determined by chemical agent detector paper, may be decontaminated by airing. Each tactical vehicle is authorized one M11 portable decontaminating apparatus that contains 1 1/3 quarts of decontaminating agent DS2. It is used to decontaminate parts of the vehicle that must be touched during vehicle operation, such as controls (figure 1).

(1) If the driver of the vehicle realizes that the vehicle is contaminated, he and other occupants mask and continue their mission until the situation permits decontamination outside the contaminated area.

(2) The vehicle is decontaminated with DS2, soapy water, solvents, or slurry. The M11 decontaminating apparatus is not intended for decontamination of the entire vehicle; one filling of DS2 is sufficient for emergency decontamination of the operator controls. The apparatus is used by tank crews and armored personnel carrier drivers to decontaminate those parts of the vehicle that will be touched by personnel during the mission; for example, areas touched when entering or leaving the vehicle. If sufficient DS2 is not available, gasoline, mud, rags, or any other expedient may be used. Contaminated wood surfaces and tires are decontaminated with slurry.

b. Crew-served weapons. Crew-served weapons are decontaminated by using the methods described in a above. If considered necessary, the bore can be decontaminated by using cleaning solvent or hot soapy water. Ammunition is decontaminated with DS2 solution, wiped with gasoline-soaked rags, and then dried. If DS2 is not available, ammunition may be washed with cool soapy water, rinsed, and then dried thoroughly. Ammunition corroded from contamination is disposed of, particularly if the brass parts cannot be cleaned. Dry STB (bleach) must not be used on ammunition contaminated with mustard-type blister agents because when mixed they may ignite and start a fire. After decontamination, weapons are disassembled, washed, rinsed, dried, and oiled to prevent corrosion.

c. Optical instruments. Optical instruments are decontaminated by blotting with rags, wiping with an organic solvent (lens-cleaning solvent only is used for the lens), and then allowing them to air. If available, hot air is used to decontaminate most optical instruments.

d. Communication and radar equipment. Communication equipment is decontaminated by using hot air, if available. The next best method is by airing or weathering. The metal parts of field telephones and radios are decontaminated with DS2 and then wiped with rags. Electrical devices that contain tubes or other heat-producing equipment normally are decontaminated by the heat given off during operation.

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3. Biological decontamination of unit equipment.

a. Decontaminate vehicles using any of the following methods.

(1) Apply detrochlorite. Leave on 30 minutes, then remove by washing with a stream of water.

(2) Wash with detergent and high-pressure water stream.

(3) Steam clean, using detergent.

b. Weapons. Use detrochlorite, household bleach solution, or soap and water. Dry and lubricate working parts and surfaces after decontamination.

c. Clothing and instruments - Use vapors of ETD-flourinated hydrocarbon mixture in plastic (polyethylene) bag. Leave in bag 8 hours, then air for 1 hour.

4. Radiological decontamination of unit equipment. The three methods of radiological decontamination are aging, sealing, and removal. The method most desirable for the decontamination of vehicles and equipment is aging. This method can be used only when there is not an immediate need for the vehicle and the contaminant is not too long-lived. Brush loose, dry contamination from the vehicle before starting the aging process to preclude absorption of radioisotopes which become dissolved in rainwater or other moisture. If the vehicle is required for immediate use, brush loose contamination from the surface and clean the vehicle by washing or scrubbing with steam or water and detergents. More extreme procedures include the removal of the protective finish with organic solvents and solutions or strong caustic solutions. These solvents and solutions should not be allowed to come in contact with rubber articles. Special attention should be paid to areas near the driver and to the controls.

TASK NUMBER: 071-11A-0126

REFERENCES:

FM 21-40, Chemical, Biological, Radiological, and Nuclear Defense

TM 3-220, Chemical, Biological and Radiological (CBR) Decontamination.

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TRAINING AND EVALUATION OUTLINE

TASK

OPERATE AN IM 174A/PD RADIACMETER.

EVALUATION

CONDITIONS:

Given a calibrated IM 174A/PD radiacmeter and two complete sets of the following batteries:

- two batteries BA-1391/U
- two batteries BA-1396/U
- two batteries BA-1006/U

(For test purposes, one set may have 1 or more dead batteries; the other set must have all 'good' batteries.) Subsequently given a mission to conduct area monitoring with the IM 174A/PD Radiacmeter.

STANDARDS:

1. Within 7 minutes:

a. Install one set of batteries,turn radiacmeter on, and wait 2 minutes.

b. Correctly determine if batteries are operational. (If they are not, remove the batteries and repeat steps 1a and 1b within 7 additional minutes.)

2. Within 3 minutes of getting a good 'CHECK':

a. Correctly zero meter.

b. Set function switch on 'OPERATE'.

c. Hold IM 174A/PD about 1 meter off ground and determine correct reading.

TRAINING

1. Preparation for use of IM 174A/PD Radiacmeter.

a. Unsnap the snap fasteners and remove the radiacmeter from the carrying case (figure 1).

b. Set the zero control (figure 2) to OFF.

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c. Unscrew the captive screw on the bottom of the battery cover (figure 3).

d. Remove the battery cover which contains the battery board assembly.

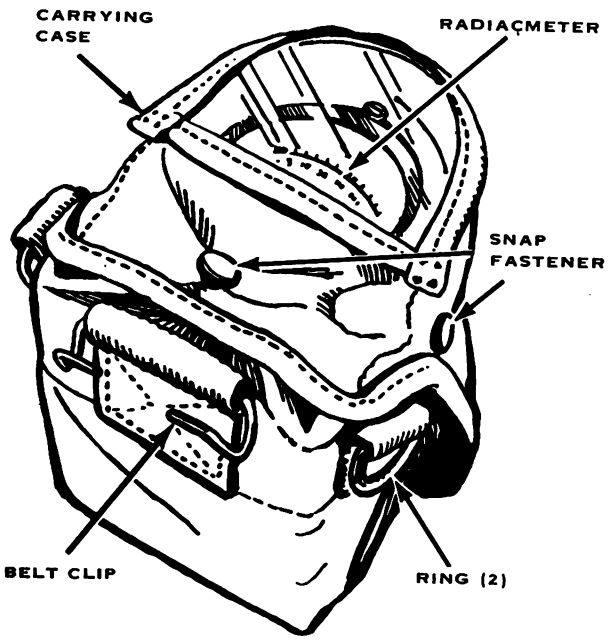

Figure 1.
Radiacmeter housed within carrying case.

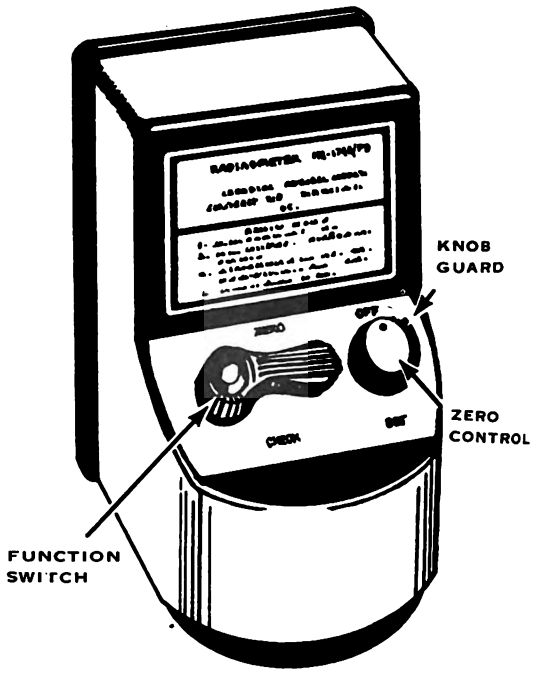

Figure 2.
Radiacmeter controls.

e. Carefully lift the top battery contacts for the BA-1006/U (figure 4) and slide the two batteries BA-1006-U in their respective positions so that the + (plus) polarity marking on each battery is down (facing the battery board assembly); release the battery contacts.

f. Repeat the procedure given in e above and install the two BA-1391/Us.

g. Carefully insert the two BA-1396/Us in their contacts so that the + (plus) polarity marking on each battery coincides with the + polarity marking on the battery board assembly.

h. Carefully position the battery cover, which contains the battery board assembly, on the cover assembly so that the cable, attached to the battery board assembly (figure 3), is at the rear of the radiacmeter.

i. Secure the battery cover, which contains the battery board assembly, to the radiacmeter; tighten the captive screw.

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NOTE: If the radiacmeter contains an instrument light, proceed to sub-paragraph j below. If the radiacmeter does not contain an instrument light, proceed to sub-paragraph o.

j. Remove the cover from the instrument light (figure 5) by lifting up on the tab (not shown) at the rounded (bottom) end of the cover.

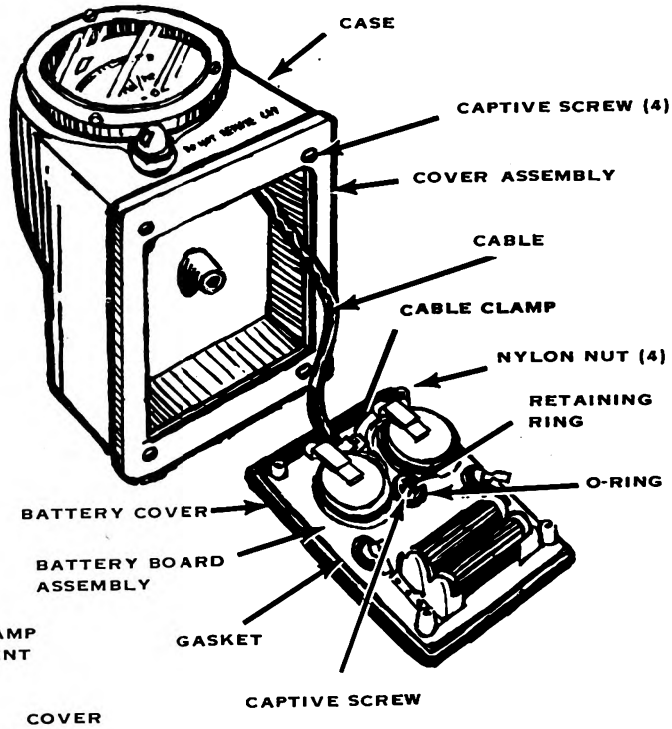

Figure 3. Battery cover removed from radiacmeter.

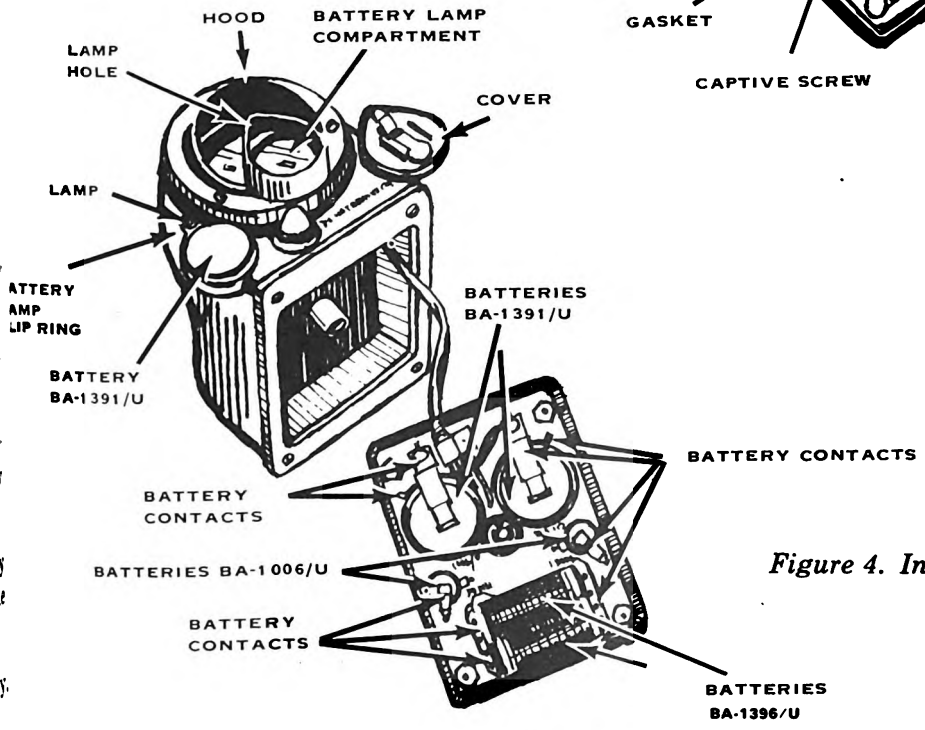

Figure 4. Installing batteries.

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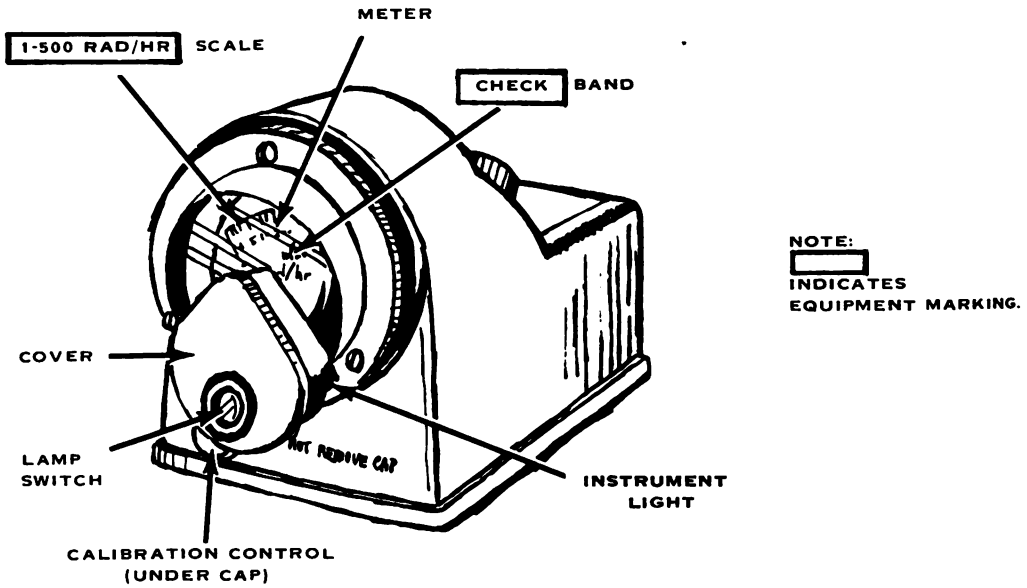

Figure 5. Radiacmeter (with instrument light), front and right sides.

k. Remove the battery/lamp clip ring containing a lamp from the battery/lamp compartment (figure 4).

l. Install a battery BA-1392/U in the battery/lamp clip ring so that the + polarity marking on the battery is facing the same direction as the glass portion (not shown) of the lamp.

m. Insert the battery/lamp clip ring containing the battery and the lamp in the battery/lamp compartment so that the glass portion of the lamp fits into the lamp hole, and the + polarity marking on the battery is down (facing the meter).

n. Replace the cover on the instrument light by fitting the pointed end of the cover on the pointed end of the battery/lamp compartment and carefully pressing down on the rounded (bottom) end of the cover (figure 5).

o. Replace the radiacmeter in its carrying case, and secure the snap fasteners.

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2. Operating instructions (controls and indicator).

Control or Indicator	Function
Zero control	When placed at OFF, turns radiacmeter off. When placed at SET, turns radiacmeter on and adjusts meters to zero.
Function switch (spring-loaded).	When placed at ZERO, permits radiacmeter, meter to be adjusted to zero in or out of a radiation field. When placed at CHECK, permits circuits and batteries to be checked. When set to operate (center, normal operating position) permits intensity dose rates to be measured on 1-500 rad/hr scale of the meter.
Meter	Indicates radiation dose rate from 1 to 500 rad/hr. **NOTE: Also indicates 0 (zero) during zero adjustments; and in CHECK band during check of circuits and batteries.**
Calibration control (under cap)	Caution: The operator or organizational repairman should not remove cap of calibration control. A higher category of repair is required. Calibration control (on left side of front panel) permits the depot repairman to calibrate the radiacmeter at 100 rad/hr when the function switch is set to operate (center position).
Lamp switch (spring-loaded)	When pressed, turns instrument light lamp on. When released, turns instrument light lamp off.

[1]Applicable only to those radiacmeters equipped with an instrument light.

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3. Operating under usual conditions. Simplified operating instructions are provided on the operating instructions plate at the rear of the operating controls (figure 1). Detailed operating instructions are provided below.

a. Unsnap the fasteners on the front and sides of the carrying case (figure 1). Push back the top part of the carrying case, and secure it to the carrying case snap fastener near the rear of the carrying case (figure 6).

NOTE: During operation of the radiacmeter (b through h below), the radiacmeter should be positioned so that the meter face is up and parallel to the ground.

NOTE: Some radiacmeters do not have an instrument light, but have a slightly radioactive dial that permits reading of the meter under low light level conditions. Others do not have a radioactive dial, but have an instrument light that permits reading of the meter under low light level conditions. To operate the instrument light (figure 3), press and hold the lamp switch; the lamp should light. When the lamp switch is released, the lamp should go out.

b. Turn on the radiacmeter by turning the zero control (figure 2) clockwise from OFF. Allow at least 2 minutes for the radiacmeter to warmup; if time permits, allow 20 minutes for complete warmup.

c. Press and hold the function switch to ZERO and adjust the zero control until the meter (figure 4) indicates 0 (zero).

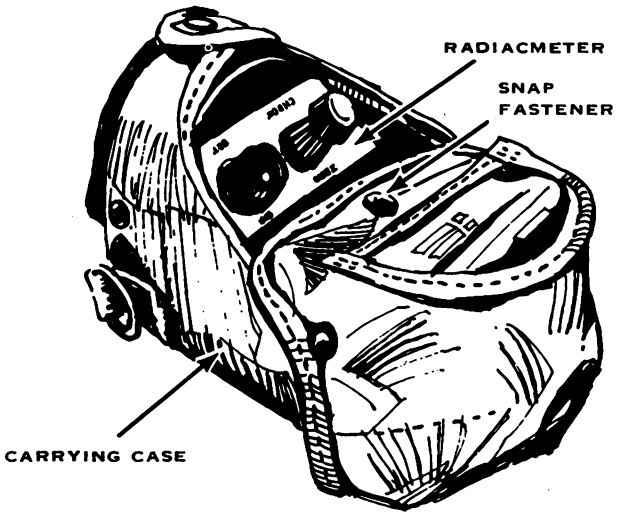

Figure 6. Radiacmeter (in carrying case) ready for operation.

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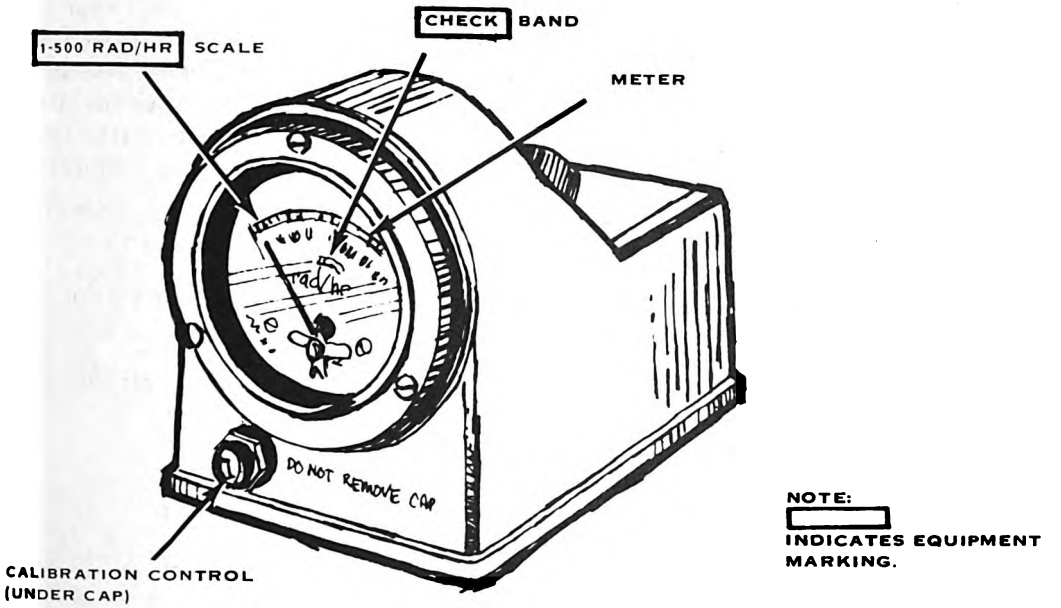

Figure 7. Radiacmeter, front and right sides.

d. Release the function switch (figure 2); the pointer of the meter (figure 4) should swing up-scale to between 5 and 10 rad/hr, then fall back to 0.

e. Press and hold the function switch to CHECK. The pointer of the meter should indicate within the CHECK band on the meter scale. (If the pointer of the meter indicates outside of the CHECK band, replace each battery with a new one.)

f. Release the function switch. The pointer of the meter should return to 0.

g. Unsnap the carrying case snap fastener at the rear of the carrying case. Pull the top part of the carrying case over the top of the radiacmeter, and fasten the snap fasteners on the sides and front of the carrying case.

h. Measure the radiation dose rate by taking the reading indicated on the 1-500 rad/hr scale of the meter. Observe the radiation readings through the front clear face of the carrying case.

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NOTE: When the radiacmeter is operated continuously over a period of hours or when extreme temperature changes are experienced, a small drift or change in the zero reading may occur. To correct this action, the operator must readjust the appropriate control (c through f above). Measurements taken with the radiacmeter are not accurate unless the zero control is properly adjusted.

i. When radiation dose rate readings have been completed, turn off the radiacmeter as follows:

(1) Unsnap the snap fasteners on the front and sides of the carrying case.

(2) Push back the top part of the carrying case.

(3) Turn the zero control (figure 2) counterclockwise to OFF.

CAUTION: When the equipment is not in use, remove the batteries. If the radiacmeter is equipped with an instrument light, tag the battery that is being removed from the instrument light as this battery should only be used in it.

(4) Pull the top of the carrying case over the top of the radiacmeter, and fasten the snap fasteners on the sides and front of the carrying case.

4. Operation under unusual conditions.

a. The radiacmeter can operate under unusual conditions, such as extreme heat, cold, humidity, and altitude without special precautionary measures. At low temperatures, however, the batteries used to power the radiacmeter have a shorter life than at room temperatures. At -50°F a continuous working life of approximately 9 hours can be expected; for a longer period, replace batteries with fresh batteries.

b. If readings must be taken under the adverse conditions described in a above, a spare set of batteries should be available. These batteries may be stored inside the operator's clothing so that the operator's body will supply the heat necessary to keep the batteries at a desirable temperature. The batteries may then be exchanged with the cold batteries. The cold batteries will recover after warmup and may be reused.

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NOTES:

1. If the radiacmeter is equipped with an instrument light, segregate the battery that is removed from the instrument light because this battery should only be used in it.

2. The IM 174B/PD will soon replace the IM 174A/PD. The operation of the radiacmeter will not change. It will use only one BA 30 battery and has better accuracy.

TASK NUMBER: 071-11A-0170

REFERENCE:

TM 11-6665-232-12, Radiacmeter IM-174A/PD

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TRAINING AND EVALUATION OUTLINE

TASK

PREPARE AND SUBMIT NBC 1 REPORTS.

EVALUATION

CONDITIONS:

Given an immient enemy NBC attack, an observed indication of an enemy NBC attack, and the NBC 1 reporting format.

STANDARDS:

1. Report the item "Type of Report" and letter items D, H, and either B and C or F in the initial NBC 1 report.

2. Send the initial report in the same format as a SHELLREP.

3. Report the initial and subsequent NBC 1 reports using the correct precedence.

TRAINING:

1. NBC information source. The NBC information source may be a unit under attack or a unit observing an attack. The NBC information source submits NBC reports through command, intelligence, or artillery communications channels, as appropriate, to the designated headquarters TOC by the fastest means.

a. Initial NBC 1 reports are sent to next higher headquarters, with a **FLASH** message precedence.

b. Subsequent NBC 1 reports are sent to next higher headquarters, with an **IMMEDIATE** message precedence, giving followup data.

2. NBC 1 reports. NBC 1 reports follow the same format as the SHELLREPS and MORTREPS dealing with conventional enemy attacks.

a. The item "Type of Report", and letter items D, H, and either B and C or F must always be reported, other items are optional (see table 1).

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b. Users of NBC 1 reports are not confined solely to the use of letter items shown in table 1; other letter items from paragraph E-6, section II, App E, FM 21-40 may be added at the users' discretion.

3. Preparing nuclear burst report. The most probable sequence of events and the recommended field procedures for the observer gathering nuclear burst data are outlined below.

a. At the instant of the "blue-white flash," hit the ground, start the stopwatch (if available), and start counting slowly - 1000 and one, 1000 and two, 1000 and three, and so on until the arrival of the shock wave or blast/bang. Do not look at the fireball. Stay under cover if possible until the shock wave or blast/bang has passed and debris has stopped falling. Make a mental note of the count on which the shock wave arrived (for example, 1000 and four), stop the stopwatch (if used), and continue counting to 1000 and five.

b. After the shock wave (blast/bang) has passed or the count of 1000 and five is reached (whichever is later), uncover the eyes, read the local time (wristwatch reading) to the nearest second, and then observe the developing cloud. If the bang is not heard in 5 minutes (that is, a count of 300), continue with other measurements.

c. Record the count on which the shock wave arrived as letter item J (for example, 4 seconds), or record the stopwatch reading, if used. Record the local time reading made (b above) to the nearest minute as letter item D. If throwout (earth particles that fallen back and built up on the edge of the crater) can be observed or if a thick, dense stem has developed, report "SURFACE" as letter item H (see figure 1). If the stem is not connected to the mushroom part of the cloud, report "AIR". If in doubt or if determination definitely cannot be made, report "UNKNOWN" as letter item H. If throwout was observed, also enter YES as letter item K; otherwise leave blank.

d. If visibility permits observation of ground zero (GZ), determine by map inspection the coordinates of GZ, and record them with the name of the place as letter item F.

e. If ground zero cannot be observed, measure the azimuth from observer location to the center of the stem or mushroom cloud. Enter this azimuth in mils or degrees, state which, as letter item C.

f. Complete letter item B and submit the initial nuclear burst report (NBC 1).

4. Example nuclear burst reports (NBC 1).

a. Example of initial nuclear burst report. The initial nuclear burst report normally is transmitted with a FLASH precedence. This example illustrates voice transmission. The observer's location is encoded for security reasons.

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Example Initial Nuclear Burst Report:

FLASH 090910 ROMEO
UNCLASSIFIED
FROM REDDOG TO AMIGO
NBC 1 NUCLEAR
BRAVO SHACKLE DELTA HOTEL BRAVO UNSHACKLE
CHARLIE GRID 182 MILS
DELTA 090907 ROMEO
HOTEL SURFACE
JULIET 60
END OF MESSAGE

b. Example of subsequent nuclear burst report. The subsequent nuclear burst report normally is transmitted with an IMMEDIATE precedence.

(1) This example illustrate the subsequent report by voice transmission with data for letter item L obtained at 5 minutes after the burst.

Example Subsequent Nuclear Burst Report (including letter item L)

IMMEDIATE 090913 ROMEO
UNCLASSIFIED
FROM REDDOG TO AMIGO
NBC 1 NUCLEAR
BRAVO SHACKLE DELTA HOTEL BRAVO UNSHACKLE
CHARLIE GRID 182 MILS
DELTA 090907 ROMEO
HOTEL SURFACE
LIMA 280 MILS
END OF MESSAGE

(2) This example illustrates the subsequent report with letter item B in the clear and data for letter item M obtained at 10 minutes after the burst.

Example Subsequent Nuclear Burst Report (including letter item M)

IMMEDIATE 090918 ROMEO
UNCLASSIFIED
FROM REDDOG TO AMIGO
NBC 1 NUCLEAR
BRAVO ET 054066
CHARLIE GRID 182 MILS
DELTA 090907 ROMEO
HOTEL SURFACE
MIKE 550 MILS TOP
END OF MESSAGE

5. Examples of initial and subsequent NBC 1 chemical reports. Company A, 2d Battalion of the 1st Brigade, is under artillery chemical attack. The callsign of the 2d Battalion is REDDOG and the 1st Brigade is VICTOR. Examples of initial and subsequent NBC 1 chemical reports from the company through the battalion are given below. The actual message format follows the unit SOP.

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a. Actions by Company A. First, the company alerts its subordinate units on the company net with a FLASH precedence brevity code "GAS".

(1) Initial NBC 1 chemical report. The company alerts the 2d Battalion (S3) with an initial NBC 1 report, as follows:

FLASH
201408 HOTEL
FROM ALFA
TO REDDOG
NBC 1 CHEMICAL

BRAVO MARVILLE
DELTA 201405 HOTEL
FOXTROT LIMA BRAVO 205305 ESTIMATED
GOLF ARTILLERY
HOTEL AIR

The actual message might be transmitted as follows:

FLASH FLASH, REDDOG REDDOG, NBC 1 CHEMICAL, FROM ALFA, 201408 HOTEL, BRAVO MARVILLE, DELTA 201405 HOTEL, FOXTROT LIMA BRAVO 205305 ESTIMATED, GOLF ARTILLERY, HOTEL AIR, END OF MESSAGE.

Letter	*Meaning*	*Example*	
	Precedence*		
	Date/Time (local or ZULU, state which)		
	Security Classification		
	From		
	To		
	Type of Report	NBC 1 (Nuclear)	NBC 1 (Chemical)
A.	Strike serial number, if known		
B.	Position of observer (UTM or place)	B. LB196400	B. MARVILLE
C.	Direction measured clockwise from grid or magnetic north (state which) of the attack from observer degrees or mils, state which)	C. Grid 060 degrees	
D.	Date/time of detonation (local or ZULU, state which)	D. 201405 local	D. 201405 (local)
E.	Illumination time (seconds)		E. 201412 (local)
F.	Location of attack (UTM or place) (actual or estimated, state which)		F. LB205305 est
G.	Means of delivery, if known		G. Artillery
H.	Type of burst air, surface, or unknown (state which) including height, if known	H. Surface	H. Airburst, nerve
J.	Flash-to-bang time (seconds)	J. 60	
K.	Crater present or absent and diameter, if known (meters)		
L.	Nuclear burst angular cloud width measured at 5 minutes after the detonation (degrees or mils, state which) (Do not report if data are obtained more than 5 minutes after the detonation.)	L. 280 mils	
M.	Stabilized cloud top angle and/or cloud bottom angle (state which) or cloud-top height and/or cloud-bottom height (state which) measured at 11 +10 minutes (mils, degrees, meters, or feet (state which)		

**As appropriate or as per unit SOP.*

Table 1. FORMAT NBC 1 REPORTS

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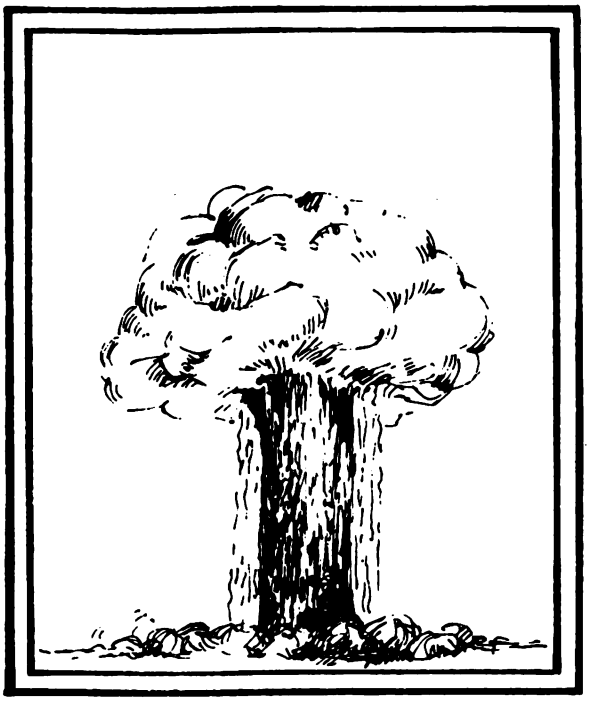
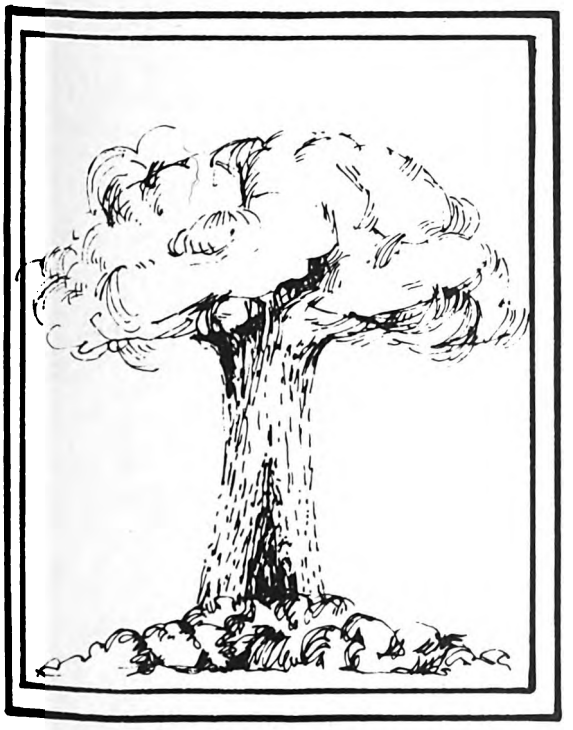
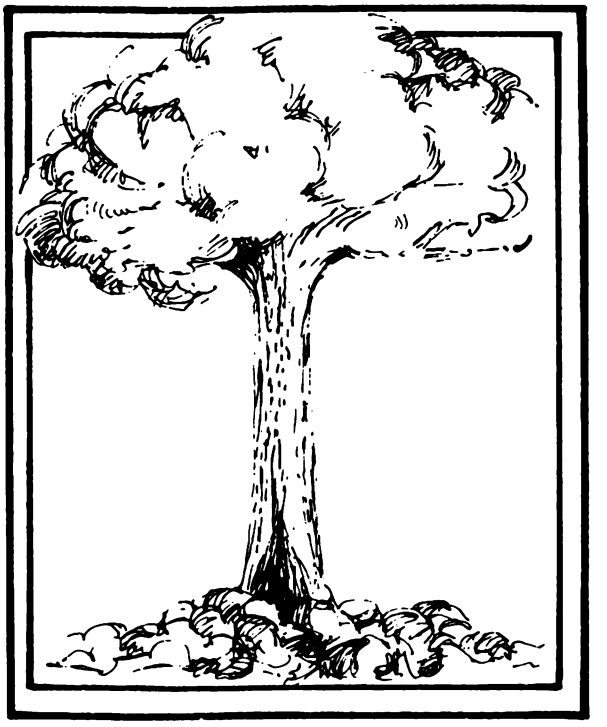
Fireball to initial cloud
(10 seconds after burst)



Growing cloud
(1 minute after burst)



Growing cloud
(3 minutes after burst)



Stabilized cloud
(4 to 14 minutes after burst)

Figure 1. Cloud development of a typical surface nuclear burst.

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(2) Subsequent NBC 1 chemical reports.

(a) When the chemical agent used in the chemical attack has been identified, the company submits a subsequent NBC 1 report, using the strike serial number assigned by the CBRE (CBR center or element) to the initial NBC 1 report and giving followup data, as follows:

IMMEDIATE
201418 HOTEL
FROM ALFA
TO REDDOG
NBC 1 CHEMICAL
ALFA 02
ECHO 201412 HOTEL
HOTEL NERVE

(b) If a persistent chemical agent was used in the attack and the contaminated area is located, the company submits another subsequent NBC 1 report, giving followup data and using the same strike serial number, as follows:

IMMEDIATE
201438 HOTEL
FROM ALFA
TO REDDOG
NBC 1 CHEMICAL
ALFA 02
X-RAY LIMA BRAVO 208303, 208308, 203303, 203308

TASK NUMBER: 071-11A-0180

REFERENCE:

FM 21-40, Chemical, Biological, Radiological, and Nuclear Defense

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TASK

INITIATE UNMASKING PROCEDURES.

EVALUATION

CONDITIONS:

Given the absence of command guidance, enemy has employed chemical agents (simulated, training only). Personnel are masked and chemical agent detector is or is not available in a field environment.

STANDARDS:

1. When a chemical agent detector is available, determine the absence of chemical agents, have two or three individuals unmask for 5 minutes and then remask for 10 minutes, then check individuals for chemical agent symptoms. If no symptoms appear, you can assume it is safe for all to unmask.

2. When no chemical agent detector is available, have two or three individuals perform the following:

a. Keeping their eyes open, take a deep breath, hold it, and break the seal of the mask for 15 seconds.

b. Re-seal mask and wait 10 minutes, watching for symptoms, with the men in a shaded area.

c. Break the seal, take 3 or 4 breaths, and then re-seal the masks.

d. Wait 10 minutes, then repeat the same procedure used when you have the detector kit.

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TRAINING

1. Unmasking when chemical agents are employed. Individuals do not unmask until authorized by their immediate commander or, in the absence of command guidance, the procedures described in 2 or 3 below are followed. The procedures are followed as a safety measure on the assumption that highly lethal agents may have been employed by the enemy.

2. Procedure when a chemical agent detector is available. The unit chemical agent detector kit (more sensitive than the chemical agent alarm) is used to test for the presence or absence of chemical agents. After determining the absence of chemical agents, two or three individuals unmask for 5 minutes and then remask for 10 minutes. After the individuals have been examined in a shady area for chemical agent symptoms and no symptoms appear, the remainder of the individuals in the group may then safely unmask. It should be noted that bright sunlight will cause contraction of the pupils of the eyes which could erroneously be interpreted as a nerve agent symptom. However, limited exposure to a low concentration of nerve agent, not detectable by the chemical agent detector kit, will cause no ill effects other than a runny nose, tightness of the chest, and sometimes pinpointing of the pupils of the eyes. These effects are usually relieved by one injection of atropine.

3. Procedure when no chemical agent detector is available. As an emergency field expedient when no chemical agent detector kit can be obtained, two or three individuals are selected by the senior-in-charge to take a deep breath, hold it, break the seal of the mask, and keep their eyes wide open for about 15 seconds. They reestablish the mask seal and wait for about 10 minutes. If no symptoms develop after 10 minutes, the same individuals again break the mask seal, take three or four breaths, and then reseal the masks. After 10 minutes, if no symptoms have developed, these same individuals unmask for 5 minutes and then remask. After 10 minutes, if no symptoms appear, the remainder of the individuals in the group may then safely remove their masks. However, individuals should remain alert for the appearance of chemical agent symptoms.

4. Unmasking when irritant agents are employed. When it has been determined that only irritant agents are employed, individuals unmask on an individual basis when the agent cloud has dispersed in their particular area. Individuals then break the seal of the mask around the face and take several breaths to make sure that the area is clear before removing their masks.

TASK NUMBER: 071-11A-0105

REFERENCE:

FM 21-40, Chemical, Biological, Radiological and Nuclear Defense

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TRAINING AND EVALUATION OUTLINE

TASK
IMPLEMENT MISSION-ORIENTED PROTECTIVE POSTURE (MOPP).

EVALUATION

CONDITIONS:

Given commander's guidance for MOPP, chemical protective clothing/ equipment.

STANDARDS:

1. Insure subordinates properly put on chemical protective clothing/ equipment.

2. Direct subordinates in performance of a physical task, insuring adherence to unit's MOPP.

3. Make appropriate changes to MOPP as situation dictates.

TRAINING

1. **Fitting of protective clothing.** To be effective, protective clothing must fit the wearer comfortably and cover him completely. To insure complete protection, all garment openings must be closed securely. In addition to the directions on the instruction labels, special attention must be paid to:

a. **Closures.** If a garment fits poorly due to faulty closures, the garment should be exchanged for clothing with satisfactory closures.

b. **Shrinkage.** Impregnation, decontamination, and laundering cause clothing to shrink. Clothing which has been reimpregnated must be resized upon return to proper channels for storage and issue.

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c. **Socks.** Impregnated socks are issued in the size normally worn.

d. **Gloves.** Impregnated cotton gloves should overlap sleeves about 5 inches.

2. Wearing of protective clothing.

a. **Donning.** Before putting on the chemical protective clothing outfit (figure 1), attach the M6A2 or M6 protective mask hood to the M17A1 or M17 field protective mask assembly, then proceed as follows:

(1) Put on cotton T-shirt and shorts.

(2) Put on trouser liner.

(3) Put on outer trousers and attach liner waist tie tapes through belt loops of the outer trousers.

(4) Button inside gas flap button of the trouser liner.

(5) Put on chemical protective socks.

(6) Put on protective combat service boots or black rubber insulated boots, as required.

(7) Put on shirt liner.

(8) Put on outer shirt. Do not tuck the shirttail of the outer shirt into the outer trousers.

(9) Put on protective mask, with protectve mask hood attached.

(10) Put on chemical protective gloves (see figure 2).

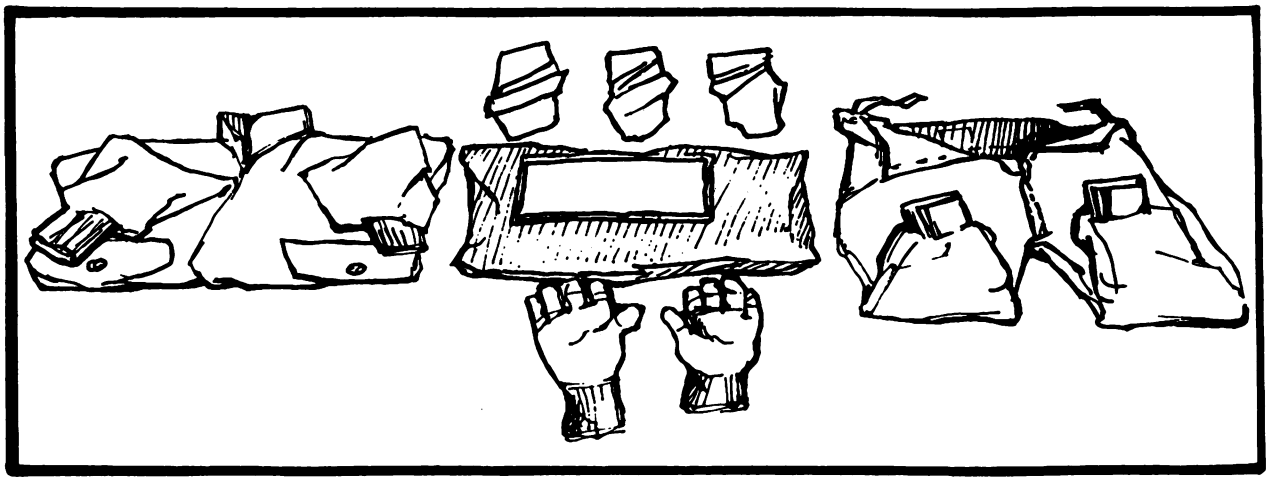

Figure 1a. Chemical protective clothing bag with components.

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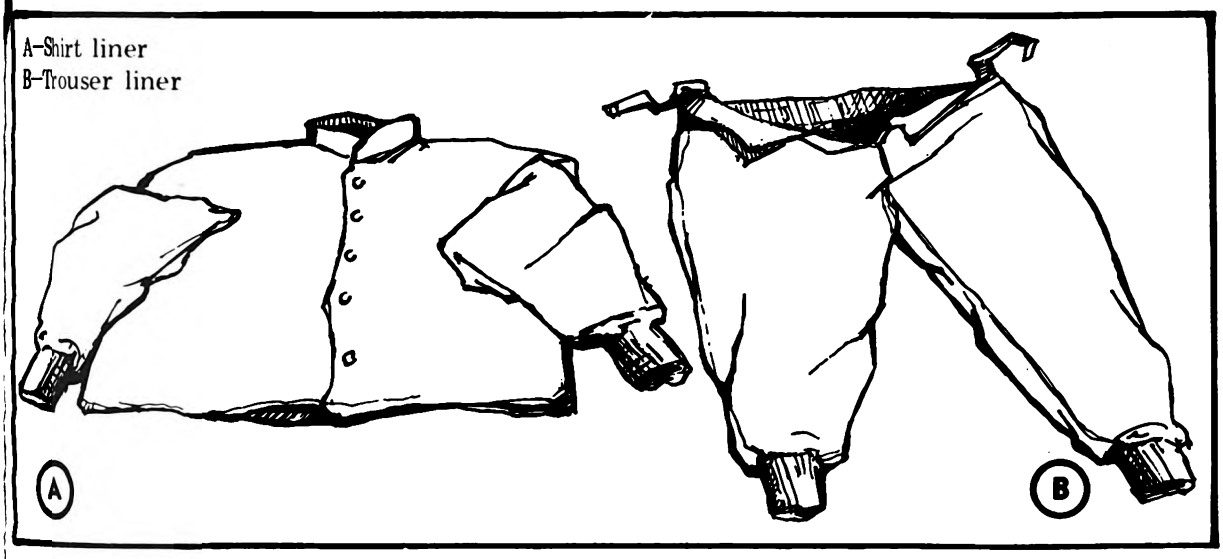

Figure 1b. Chemical protective shirt and trouser liner.

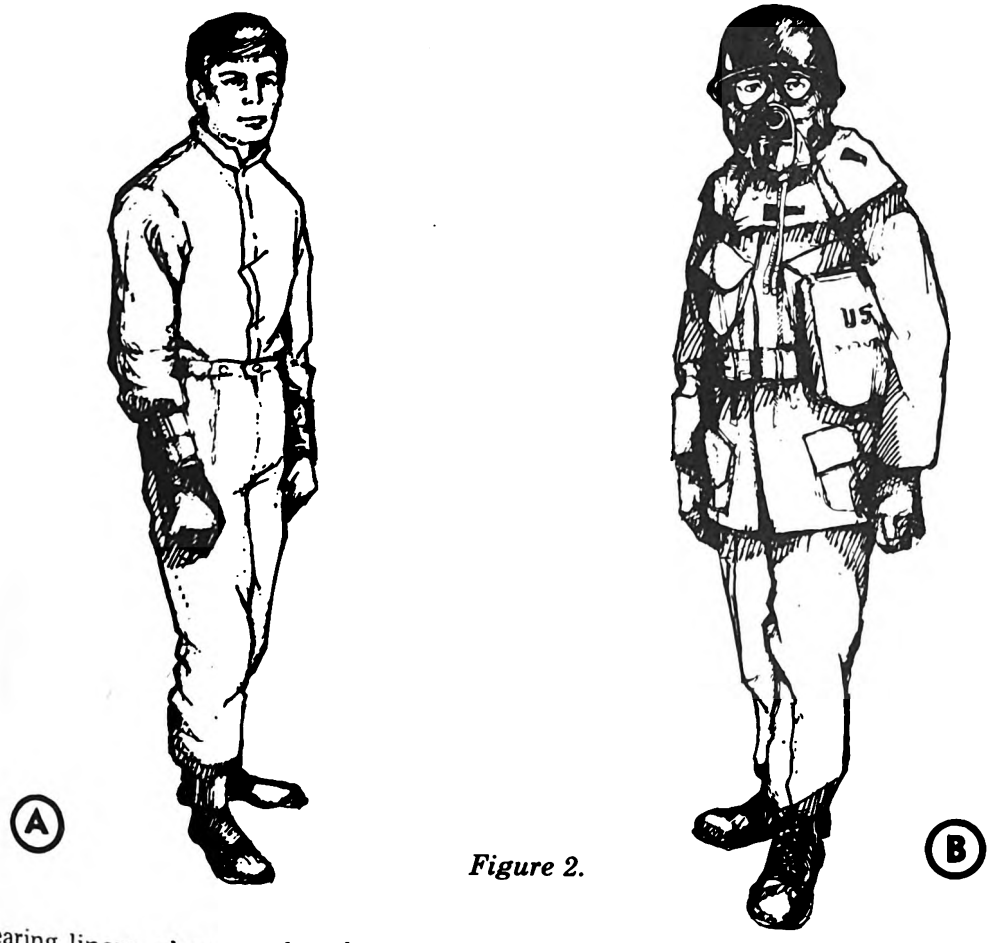

Figure 2.

A–Wearing liners, gloves, and socks
B–Wearing liners, tropical uniform, field protective mask and hood, and boots

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Table 1. Example Variations of the Mission Oriented Protection Posture.

WORK RATE[1] (para 8-8b)	TEMPERATURE RANGE		
	Cool (50°-70° WBGT)[1]	Warm (70°-85° WBGT)[2]	Hot (85°-100° WBGT)[2]
Low	Wear full protective clothing and equipment.	Progressively open mask hood and clothing.	Remove and carry mask and hood, and gloves. Remove some protective clothing or duty uniform.
Moderate	Wear full protective clothing and equipment.	Remove and carry mask and hood, and gloves. Open protective clothing and duty uniform.	Remove and carry mask and hood, and gloves. Remove some protective clothing or duty uniform.
Heavy	Remove and carry mask and hood, and gloves. Progressively open and/or remove some protective clothing or duty uniform.	Remove and carry mask and hood, and gloves. Remove some protective clothing or duty uniform.	Remove and carry mask and hood, and gloves. Remove protective clothing or duty uniform.

[1] *Examples:*
Low: Motorized movement or administrative work.
Moderate: Improvement of defensive position or reserve position activity.
Heavy: Infantry dismounted assault or forced march.

[2] See footnote in paragraph 8-8b, FM 21-40.

Table 2. Work Pacing Guidance for Personnel Dressed in Chemical Protective Clothing[1]

Warning: This table is intended as a guide only and should be used with table 1.

WORK RATE (para 8-8b)	SUGGESTED MAXIMUM SAFE UNIT WORK TIME TO MINIMIZE MODERATE RISK OF HEAT ILLNESS[2,3]					
	Temperature Range[4]					
	Cool[5] (50°-70°F)		Warm (70°-85°F)		Hot (85°-100°F)	
	Open Suit[6]	Closed Suit[7]	Open Suit[6]	Closed Suit[7]	Open Suit[6]	Closed Suit[7]
Low	60 up[8]	40-60[8]	45-60[8]	25-40	30-45	15-25
Moderate	45-60[8]	30-45	30-45	20-30	20-30	15-20
Heavy	20-30	15-20	15-20	10-15	10-15	5-10

[1] This applies to personnel dressed in standard-A chemical protective clothing or standard-B impregnated clothing (para 4-2), FM 21-40

[2] Time is in minutes (derived empirically by extrapolation of laboratory and troop test data and by evaluation of psychological factors for trained troops).

[3] Rest periods are primarily temperature dependent. Required rest breaks to dissipate heat build-up will range from normal breaks at cool temperatures to indefinitely long breaks at hot temperatures. (Little or no heat load can be dissipated at hot temperatures.) In the warm temperature range, troops should be able to repeat similar work effort for the same periods after resting approximately twice as long as they have worked.

[4] The specific temperatures in parentheses at a relative humidity of approximately 75 percent do not differ significantly from the WBGT described in paragraph 8-8b, FM 21-40.

[5] In temperatures below 50°F, normal work pacing will be sufficient if adequate environmental clothing is removed.

[6] Open Suit refers to protective clothing and duty uniform worn *open*, and carrying mask and hood, and gloves.

[7] Closed Suit refers to protective clothing and duty uniform worn *closed*, and wearing mask and hook, and gloves.

[8] Sixty minutes is intended to indicate the time for a normal break period. The 60-minute break period may be exceeded if in the judgment of the unit commander there will be no hazard to personnel.

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b. **Removing.**

(1) **No contamination.** Removal of the chemical protective clothing outfit is the same as removal of any other clothing.

(2) **Slight contamination.** When the clothing is contaminated with small droplets of spray or aerosol, use the M13 decontamination and reimpregnating kit.

(3) **Gross contamination.** The wearer must immediately take off the clothing or cut out the portion that has been wet, to prevent continued contact of liquid chemical agent with his skin.

c. Maximum protection against NBC agents requires that protective clothing be worn at the "ready" or "buttoned up" position. Body ventilation under these conditions will be at a minimum and may result in discomfort and heat injury, particularly during prolonged periods of wear in hot weather. These effects can be minimized by wearing the protective clothing during training activities and taking the following precautions during training exercises and during NBC operations. (See tables 1 and 2).

3. STANDARD - A CHEMICAL PROTECTIVE OVERGARMENT ENSEMBLE. (NEW ITEM) The expendable two-piece overgarment consist of one coat (shirt) and one pair of trousers with fly front. It is packaged in a sealed vapor-barrier bag. (The bag provides protection against rain, moisture, and sunlight and also has an instruction label.) Three pairs of cushion sole socks and one pair of gloves are issued separately. The shirt and trousers are made of material having an outer layer of nylon cotton and an inner layer of charcoal impregnated polyurethane foam that gives protection against vapors, aerosols, and small droplets of nerve and blister agents. The overgarment is intended to be worn over the duty uniform; however, in high temperatures, it may be worn directly over the underwear. This item normally is issued to troop units forward of the brigade rear, as designated by the division commander. The overgarment is not designed to be decontaminated and reimpregnated for reuse. It is discarded within 6 hours after being contaminated with liquid chemical agents or when it becomes worn or ripped to the extent that it cannot be repaired with the individual issue patch accessory.

TASK NUMBER: 071-11A-0106

REFERENCES:

FM 21-40, Chemical, Biological, Radiological, and Nuclear Defense
TM 10-277, Protective Clothing Chemical Operation

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TRAINING AND EVALUATION OUTLINE

TASK

PROTECT SUPPLIES AND EQUIPMENT FROM NBC HAZARDS.

EVALUATION:

CONDITIONS:

SITUATION 1: The enemy is capable of NBC attack, enemy NBC attack is imminent, and the usual individual/unit equipment, food and water supplies are on hand.

SITUATION 2: After an NBC attack.

STANDARDS:

SITUATION 1: Demonstrate correct measures to protect individual/unit equipment, food and water from effects of NBC hazards.

SITUATION 2: Correctly indicate items of food/water that are safe for consumption following enemy NBC attack.

TRAINING:

1. Protection of equipment and supplies from chemical contamination. Because contaminated equipment and supplies present a threat to personnel, covers are used to protect equipment and supplies stored outdoors. The following guidance is appropriate for units in the field and in support of combat operations:

a. Equipment. Important items of equipment are covered. Plastic sheets serve as excellent covers because they are nonporous. If plastic material is not available, tarpaulins or other suitable material may be used. If no other cover is available, dense foliage will provide some protection. The following are sample means of protection for listed items:

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(1) **Ammunition** is covered or kept in its containers as long as possible.

(2) **Weapons** are covered or dispersed under foliage when possible.

(3) **Instruments,** such as those used for fire control, are kept in their containers when not being used because they are subject to corrosion by certain chemical agents.

(4) **Vans** are located to take advantage of any available natural shielding. If possible, vans are located so that the air conditioners are opposite the prevailing wind direction. Personnel responsible for the operation of the vans should make every effort possible to reduce leakage in vans and components such as the air conditioners.

(5) **Vehicles** are located in woods or under bushes, or are dispersed and covered, if possible.

(6) **Communication equipment** not housed in shelters is covered. Special care is taken to protect the headsets on radios and the mouthpieces on telephones from contamination.

(7) **Field latrines** are provided with overhead cover.

b. Packaged food items. Vapor, aerosol, or liquid chemical agents may contaminate food. The type of food, type and amount of chemical agent, and effectiveness of protective measures influence the edibility of food. Protective measures include the packaging of food, proper storage procedures, dispersal of supplies, and maximum use of both natural and artificial shelters, or other forms of overhead cover. Foods not in protective packages generally constitute the major difficulty. The current packing methods for overseas shipment substantially reduce the possibility of contamination.

c. Unpackaged subsistence items. Chemical agents will contaminate unpackaged food; oily and fatty foods in particular are vulnerable. Foods are protected from contamination when stored in containers such as field ice boxes and refrigerators, if the sealing gaskets are serviceable. As a rule, contaminated unpackaged food will not be eaten unless released for consumption by medical personnel.

d. Water. Engineer personnel are responsible for operations of water supply systems and for the purification (decontamination) of water from these sources. Medical personnel are responsible for recommendations on the potability of water. Water suspected of contamination is not consumed until tested and declared safe.

2. Protection of supplies from nuclear attack. Unit supplies, particularly explosives and flammables, should be dispersed. Debris is kept to a minimum and is not allowed to collect to the point where a fire hazard would be created. Objects such as radios, stoves, generators, tools, and gas cans are always secured to minimize the danger of casualties from flying debris when the shock wave hits. Supplies remain packaged to provide protection against radioactive dust. Food and water are further protected by

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covered storage. Protection against nuclear radiation is primarily a problem of shielding against gamma radiation and neutrons; radiation from alpha and beta particles is essentially an internal or a contact hazard. Foxholes, bunkers, and other protective shelters are used to the greatest extent possible, consistent with the unit mission. Buildings usually are not strong enough to provide effective shelter from a nuclear explosion. However, the lowest floor or basement of a reinforced concrete or steel-framed building will offer excellent protection from all effects except the higher overpressure of blast.

3. Monitoring of food, water, equipment, and personnel. Following a nuclear attack, food, water, and equipment may be radiologically contaminated and should be monitored. A Geiger-Meuller (G-M) type dose-rate meter, such as the AN/PDR-27 (—) is used for this monitoring as it measures radiation at a lower range than does the ion-chamber type dose-rate meter, such as the IM-174A/PD. See FM 3-12 for detailed procedures.

TASK NUMBER: 071-11A-0110

REFERENCES:

FM 3-12, Operational Aspects of Radiological Defense
FM 21-40, Chemical, Biological, Radiological and Nuclear Defense

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TRAINING AND EVALUATION OUTLINE

TASK

CROSS A CONTAMINATED AREA.

EVALUATION

CONDITIONS:

Given protective clothing and equipment, a known contaminated area (radiation or chemical/biological contamination), and:

SITUATION 1: Requirement to cross the area.

SITUATION 2: Mission allows areas to be bypassed.

STANDARDS:

SITUATION 1: Demonstrate preparation to be made by:

a. Correctly putting on protective clothing.

b. Selecting the fastest route through the area (mounted or dismounted, depending on type of unit).

SITUATION 2: Bypass the area without any individual preparation.

TRAINING

1. Crossing chemical contaminated areas, table 1. Avoid contaminated areas or pass through these areas as rapidly as possible, if your

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mission permits. If you must remain in or pass through contaminated areas, you should:

a. Use all the protective equipment you have to prevent chemical agents from entering your body.

b. When possible, use vehicles and travel upwind of the contaminated area.

c. Select routes or bivouac areas on high ground since chemical agents tend to be heavier than air and settle in low places. Avoid cellars, trenches, gullies, valleys and other low places where agents may collect.

d. Avoid unnecessary contact with contaminated surfaces (such as buildings, debris, woods, shrubbery, tall grass, and puddles) which tend to hold the agent.

e. Do not stir up dust unnecessarily.

f. Liquid nerve and blister agents penetrate leather boots very rapidly if they are not treated with leather dressing. PROTECT YOUR FEET.

g. When crossing a contaminated area, turn on monitoring and/or survey equipment to determine the exact location and extent of contamination.

2. Crossing a nuclear contaminated area. If it is necessary for you to cross a radioactive area, **cross fast**. Use vehicles when possible. Floors of the vehicles should be sandbagged for greater protection, when practicable. If you have to enter and remain in a radioactive area, go in fast, dig fast, and keep down to the extent that the situation permits. Avoid unnecessary contact with materials or objects that are suspected of being contaminated. Use monitoring equipment and dosimeters when crossing to determine extent of contamination and total dose absorbed.

3. Bypassing contaminated areas. A fallout prediction will indicate the approximate location and extent of the fallout area from a nuclear detonation. However, the exact location and extent of the contaminated area and the dose rates are determined by monitoring and radiological survey. As your unit mission permits, bypassing contaminated areas requires no special preparations. When possible, use vehicles and travel upwind of both chemical and nuclear contaminated areas.

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Table 1. Approximate Duration of Hazard in Contaminated Terrain.

Warning: **This table is intended as a guide only. Chemical agent detectors must be used to determine the extent of actual contamination and vapor hazards.**

TASK	TERRAIN	APPROXIMATE TIME AFTER CONTAMINATION THAT PRESCRIBED TASKS MAY BE PERFORMED WITH NEGLIGIBLE RISK[1] (Not wearing protective clothing)[2]			
		Blister agent (mustard)			
		Temperature[3]		Uniform[4]	
		Warm (70°-85°F)	Hot (85°-100°)	Summer	Winter
TRAVERSAL[5] (Walking across area, 2 hr or less)		Wearing masks			
	Bare soil or low vegetation.[6]	36 hr	36 hr	5 hr	2 hr
	High vegetation, including jungle and heavy woods.	4 days	2 days	28 hr	10 hr
OCCUPATION (Without hitting ground, 24 hr)		Not wearing masks[7]			
	Bare soil or low vegetation.[6]	4 days	3 days	32 days	13 days
	High vegetation, including jungle and heavy woods.	4 days	3 days	32 days	13 days
OCCUPATION (Involving advance under fire, 24 hr)	Bare soil or low vegetation.[6]	4 days	3 days	32 days	13 days
	High vegetation, including jungle and heavy woods.	6 days	4 days	50 days	18 days

1 These times are safe-sided for troop safety.

2 Leather combat boots teated with protective dubbing or rubber combat boots are worn.

3 Effects of blister agent vary significantly with temperature. Mustard freezes in temperatures below 60°F. and can present a hazard when the temperature rises.

4 Protection from V-agent and thickened G-agent varies significantly with layers of clothing worn.

5 For personnel walking for 2 hours in an area contaminated by blister agents, the limiting factor is the vapor hazard. If only a few minutes are required for traversal of the area, the task can be initiated at earlier times than those given.

6 Times shown are not applicable to sand, which will hold chemical agents for longer periods of time than those given.

7 The data refer to approximate times at which personnel could occupy contaminated areas without having to wear protective masks for protection against vapor hazard.

TASK NUMBER: 071-11A-0107

REFERENCES:

FM 21-40, Chemical, Biological, Radiological and Nuclear Defense
FM 21-41, Soldier's Handbook for Defense Against Chemical and Biological Operations and Nuclear Warfare

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TRAINING AND EVALUATION OUTLINE

TASK

LEAD PHYSICAL CONDITIONING ACTIVITIES.

EVALUATION

CONDITIONS:

Given a platoon or company size unit in formation, with a requirement to conduct a specified physical activity. (Activity will be predesignated so that time is available for preparation.)

STANDARDS:

1. Be physically fit to lead physical conditioning activities.

2. Give all preparatory commands to permit the average man to understand the first one before the second one is given.

3. Be able to form and control the extended rectangular formation, circle formation, and double-time column during a field or road run.

4. Lead each exercise in accordance with FM 21-20.

5. Demonstrate each exercise (at least three repetitions) with cadence.

6. Follow guidance given concerning what, when, where, and how long activity is to be conducted.

TRAINING

1. How to prepare. Once guidance is given concerning the conditioning requirement, preparations must be made.

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a. What is the requirement? You must be familiar with the exercises in FM 21-20 if leading them is your requirement. This will require study and practice. It is also your responsibility to insure that your assistant instructors (if available) know the exercises so they can effectively supervise and demonstrate. If your requirement is, or includes, a conditioning run, you must insure that your road guards (if used), pace men, lead rank, and assistant instructors are proficient enough runners to set a good pace (and example) to the rest of the group.

b. When? An assigned starting time is just that. It is your responsibility to insure that the requirement does start on time and a system is set up to deal with late arrivals. Your assistant instructors should note the name of any individual who is late, then place him in the formation. He still needs to take part in the conditioning; he can be sent to his supervisor to explain and be dealt with after the formation.

c. Where? Once given a location to perform the requirement, you must determine if it is feasible to do it there and what plans must be made to best fit the requirement to the area. The area must be large enough. If it is a controlled area, you must insure that only you have planned to use it during your requirement time period. If the area becomes useless during bad weather (for example, knee deep in mud when it rains), an alternate area must be secured.

d. How long? You will be given a period of time in which to complete the requirement. Plans should be made with an eye to coming as close as possible to the required time **without going over it** since improper use of time can snowball through a training day and wreck a unit's schedule and morale. Timing is a function of practice. Rehearse exercises. On a run, match a realistic pace to an appropriate distance. You, not the pace man, are responsible for the pace. Allow yourself a small time leeway and don't make the instructor for the next period suffer for your lack of timing.

2. Preparatory commands and commands of execution. The **preparatory command** describes and specifies what is required, and the **command of execution** calls into action what has been prescribed. All preparatory commands are given with a rising inflection. The interval between commands is long enough to permit the average man to understand the first one before the second one is given.

3. Extended Rectangular Formation (figure 1). The formation used most frequently for carrying on physical training activities is the extended rectangular formation (figure 1). This formation is the best type to use for large numbers of men because it is easy to control. The following commands are given to form this formation.

NOTE: In figure 1 the baseman is represented by a white circle.

a. FALL OUT AND FALL IN ON THE BASEMAN. At this command, all personnel run to the designated area and re-form. This procedure is preferred to marching the unit into position. If more control is desired, the unit may march at double time to the vicinity of the baseman and then be

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directed to fall out and fall in on him. Time is wasted in the field due to needless maneuvering of troops at quick time in an effort to position the unit on the exact spot for the exercises.

b. A company size unit assumes the extended rectangular formation from a column of three's or four's at normal intervals between squads. This extension can also be executed from a company mass without interval between platoons. In extending either a platoon or company size unit take your place at the head of the column and command.

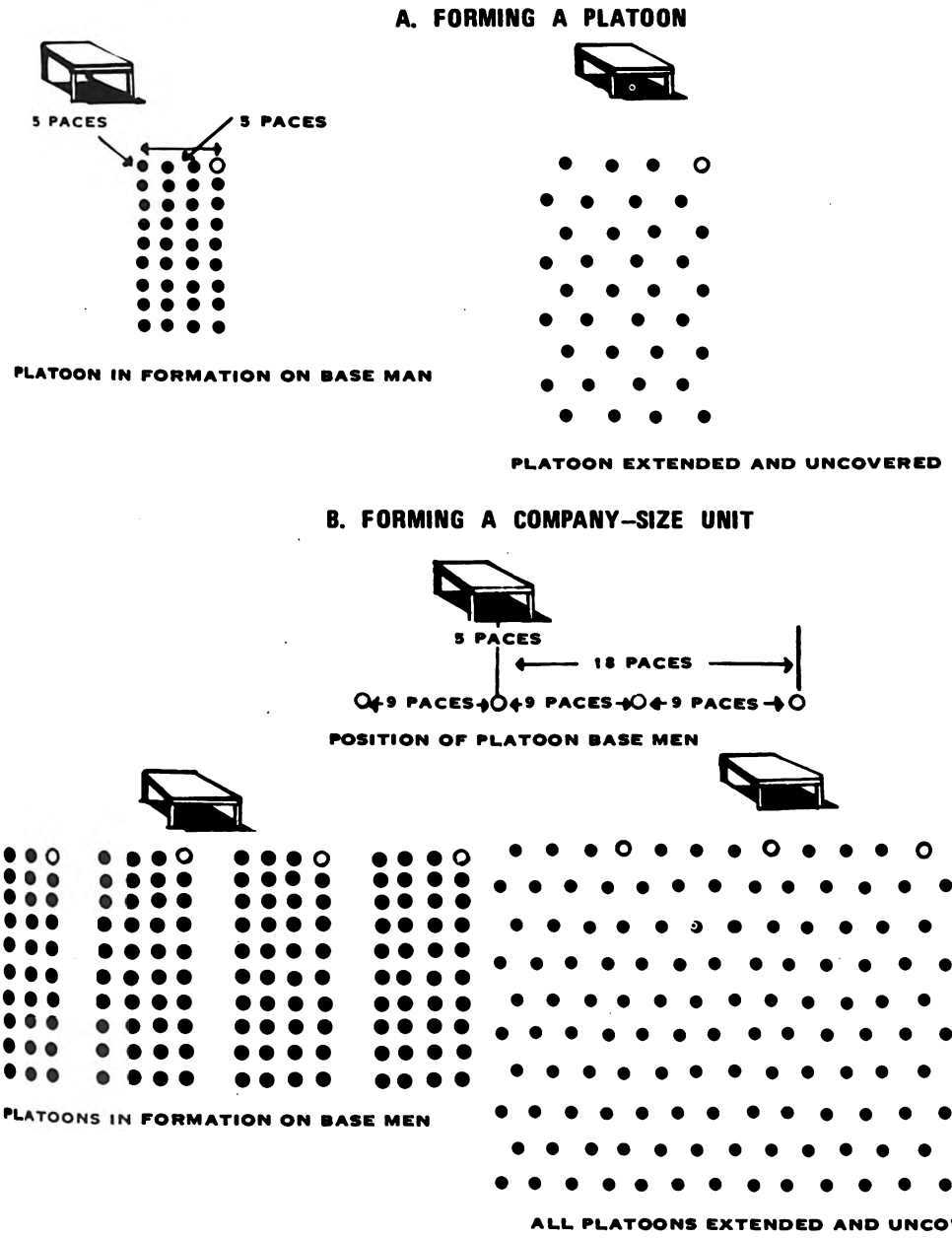

Figure 1. Forming the extended rectangular formation.

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(1) **EXTEND TO THE LEFT, MARCH.** At this command, the men in the right flank file stand fast with arms extended sideward. All other men turn to the left and run forward at double time. After taking a sufficient number of steps, all men face the front with both arms extended sideward. The distance between fingertips is about 12 inches and dress is right.

(2) **ARMS DOWNWARD, MOVE.** At this command, the arms are lowered smartly to the sides.

(3) **LEFT, FACE.**

(4) **EXTEND TO THE LEFT, MARCH.** At this command, the men in the right flank file stand fast with arms extended sideward. All other men turn to the left and run forward at double time. Spacing is the same as in (1) above and dress is right.

(5) **ARMS DOWNWARD, MOVE.** Same as in (2) above.

(6) **RIGHT, FACE.**

(7) **FROM FRONT TO REAR, COUNT OFF.** At this command, the leading man in each column turns his head to the right rear, calls off "one" and faces the front. Successive men in each column call off in turn, "two", "three", "four", "five", in the same manner.

(8) **EVEN NUMBERS TO THE LEFT, UNCOVER.** At this command, each even numbered man stride-jumps to the left, squarely in the center of the interval. In doing this, he swings his left leg sideward and jumps from his right foot to his left foot and smartly brings the right into position against the left.

c. To assemble the unit, command: **ASSEMBLE TO THE RIGHT, MARCH.** At this command, all return to their original position in the column at double time and reform on the baseman.

d. It is recommended that the area for grounding equipment and weapons be at the edge of, or well away from, the area to be used for exercising. To conserve time and insure proper position of the unit, the baseman or, if the unit is composed of several platoon size groups, the various basemen may precede the unit and establish their positions in relation to the instructor's platform.

4. Circle formation. The circle formation is effective for the conduct of various exercise activities (figure 2). This formation has an advantage in that the supervision of all men is facilitated and a moving formation is available which provides control. Guerrilla exercises, grass drills, and some forms of running, are examples of activities which are more easily conducted in the circle formation than in the extended rectangular formation.

a. When a platoon is to form a circle, the commands are **CIRCLE FORMATION, MARCH, FOLLOW ME.** Upon this command the right flank squad of the column moves forward at double time with the leader of the platoon group gradually forming a circle in a counterclockwise

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direction. Each succeeding file falls in behind that on the right. After the rough outline of the circle is formed, the leader commands, **PICK UP A FIVE-YARD INTERVAL.** This is to insure the interval between men is uniform prior to starting exercises.

b. The group may be halted and faced toward the center, or, if instruction is not necessary, the exercise activity may be executed without stopping the platoon.

5. Conditioning run. This is nothing more than a column moving over a prescribed course at double time. Reflector-vested road guards must be placed ahead of and behind the column if the course follows a road or vehicle trail. A designated pace man runs in the right guide position and, under the direction of the instructor in charge, sets and maintains the pace for the run. Routes should be selected and announced, if necessary, in accordance with post and unit SOPs.

6. Leadership Techniques.

a. Unless you experience all of the exercises you cannot appreciate how strenuous they are, what movements are the most difficult, where the errors in performance are likely to occur, and what the proper cadence should be.

b. You must give all the men careful supervision and participate in the exercises to show that you can do them. When you participate, your assistant instructors should supervise because it is difficult for you to supervise and exercise simultaneously.

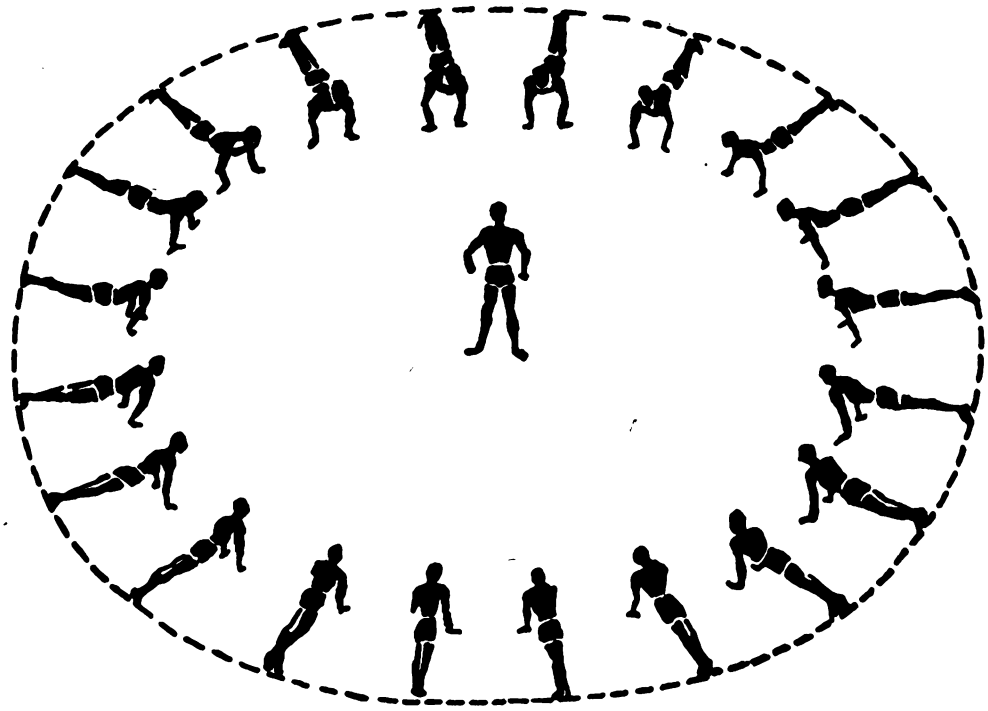

Figure 2. The circle formation.

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c. The men should never be kept too long in one position, especially a constrained one. They should never have to perform so many repetitions of an exercise that they lose the correct form. Slight deviations from the proper form reduce the value of the exercise.

d. Avoid long explanations. As a rule, it should be necessary to give a full explanation of new exercises only once. Minor corrections should be made to the entire class while the exercise is in progress (for example, "heads up", "knees straight"). If necessary, follow this correction by the name of the man who is at fault.

e. The heavy demand on your voice can be lightened by training assistant instructors to assume some of the instruction and by employing mass cadence.

f. Insure each exercise is performed in accordance with FM 21-20. Review and practice is usually required in order to perform them properly.

g. Use of a cue card (3 x 5 or scrap of paper) is recommended while leading exercises. This will prevent forgetting any exercise and help present a smooth period of training.

TASK NUMBER: 071-11A-0202

REFERENCE:

FM 21-20, Physical Readiness Training

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TRAINING AND EVALUATION OUTLINE

TASK

COMPUTE THE BACK AZIMUTH OF AN AZIMUTH.

EVALUATION

CONDITIONS:

Given a known azimuth, pencil, and paper.

STANDARD:

Within 1 minute, find the back azimuth of the given azimuth.

TRAINING

The back azimuth of a compass direction differs from its azimuth by exactly 180 degrees. To find the back azimuth of an:

a. Azimuth of less than 180 degrees (3200 mils), add 180 degrees (3200 mils).

b. Azimuth of more than 180 degrees (3200 mils), subtract 180 degrees (3200 mils).

c. Azimuth of 180 degrees (3200 mils), add or subtract 180 degrees (3200 mils) (the back azimuth is 0 degrees or 360 degrees/6400 mils).

TASK NUMBER: 071-11A-1013

REFERENCE:

FM 21-26, Map Reading

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TASK

ORIENT A MAP USING A COMPASS

EVALUATION

CONDITIONS:

Given a map and compass in a field environment, under daylight conditions.

STANDARDS:

Orient the map to the ground using a compass so that the north-seeking arrow of the compass is within 3 degrees of that shown in the G-M angle of the declination diagram.

TRAINING

1. Place the compass on the map so that the cover of the compass is pointing towards the top of the map. Aline the sighting wire, or the straightedge of the compass, over a north-south grid line and rotate the map and compass together until the north arrow of the compass points to the same number of degrees as shown in the G-M angle of the declination diagram.

NOTE: If GM angle is less than 3 degrees, do not line-up north arrow.

2. An alternate method is to draw a magnetic north line on the map from any N-S and E-W grid line intersection using the protractor. Aline the straightedge of the compass along this magnetic north line and rotate the map and compass together until the north arrow falls beneath the fixed black index line on the compass.

TASK NUMBER: 071-11A-1011
REFERENCES:

FM 21-26, Map Reading

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TRAINING AND EVALUATION OUTLINE

TASK

ORIENT A MAP BY COMPARING FEATURES ON THE MAP WITH THOSE ON THE GROUND

EVALUATION

CONDITIONS:

Given a map in a field site, under daylight conditions.

STANDARD:

You must orient the map accurately within 5 degrees.

TRAINING

Look at the map and the ground to find two linear features common to both, such as hilltops, saddles, valleys, ridges, and depressions. By alining the features on the map with the same feature on the ground (figure 1 and 2) the map is oriented.

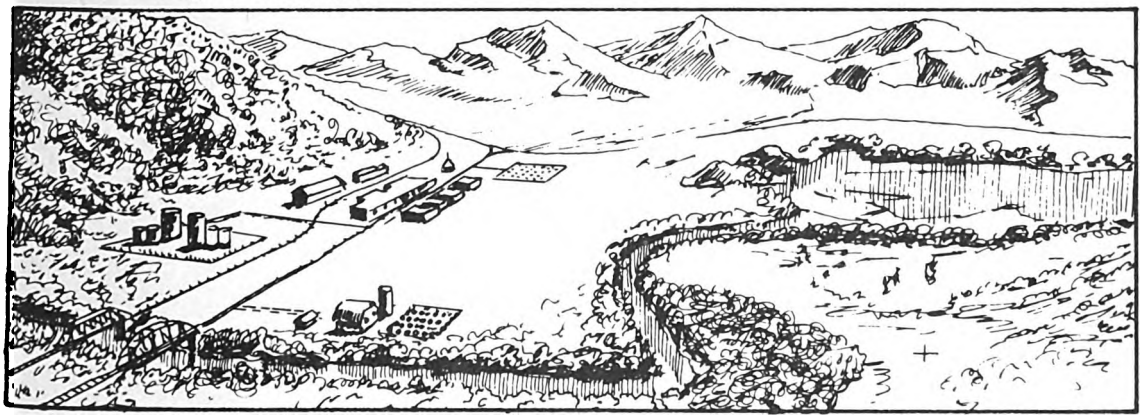

Figure 1. An area as viewed from a ground position.

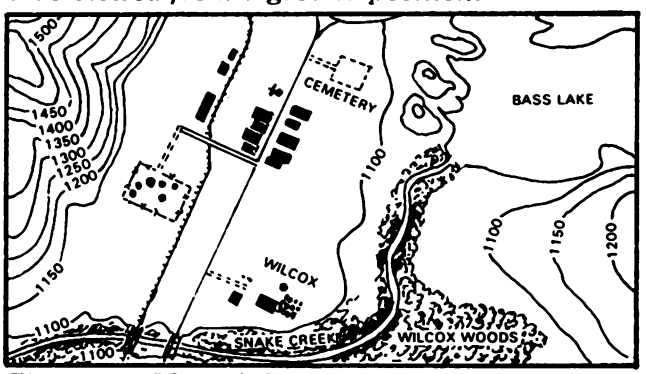

Figure 2. Map of the same area as in figure 1.

TASK NUMBER:

071-11A-1012

REFERENCES:

FM 21-26, Map Reading

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TRAINING AND EVALUATION OUTLINE

TASK

LOCATE AN UNKNOWN POINT ON A MAP OR ON THE GROUND BY INTERSECTION.

EVALUATION

CONDITIONS:

In a field location, given a 1:50,000 map of the area, compass, coordinate scale and protractor, pencil, and an object or terrain feature for which you must determine the location (grid coordinate).

STANDARDS:

Within 7 minutes (15 minutes, if you must measure azimuths) determine the 100,000 meter square identification letters and 6-digit grid coordinates to within 100 meters.

TRAINING

Intersection is a method used to locate unknown points on a map by intersecting lines from two known points.

For example: a magnetic azimuth from a known observation post (OP) to an unknown point is changed to a grid azimuth and drawn on the map. Another magnetic azimuth from another known OP location to the same unknown point is changed to a grid azimuth and drawn on the same map. Where the two lines intersect on the map is the location of the distant point.

1. Map and Compass Method (see figure 1).

NOTE: Map not to scale and an easterly G-M angle of 10° is used.

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a. Determine the G-M angle of the map you are using.

b. Locate and mark your position on the map.

c. Measure the magnetic azimuth to the unknown point (22°); change it to a grid azimuth. If it is a westerly G-M angle subtract, and add if it is an easterly G-M angle to the magnetic azimuth you found. In the example, the G-M angle used was 10° easterly.

d. Place the protractor on the map, insuring that the zero degree indicator on the protractor is pointing to the top of the map (north) and the cross is placed center mass on your location (figure 1). Place a tick mark on the number of degrees you want to plot. Draw a line on the map from your position on this grid azimuth (32°).

e. Move or call a second known position from which the unknown point can be seen. Locate this position on the map.

f. Repeat c and d above.

g. Where the lines cross is the location of the unknown point.

2. Straightedge method (when no compass is available) (figure 2).

a. (See task: **Orient a map to the ground by map-terrain association.**)

b. Locate and mark your position on the map.

c. Lay a straightedge on the map with one end at user's position (A) as a pivot point and rotate the straightedge until the unknown point is sighted along the edge.

d. Draw a line along the straightedge.

e. Repeat the above procedure at position (B), and for a check on accuracy at a third position.

f. The intersection is the location of the unknown point (C).

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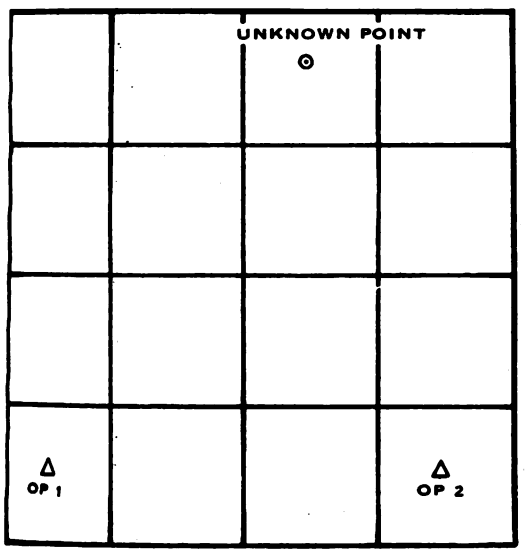
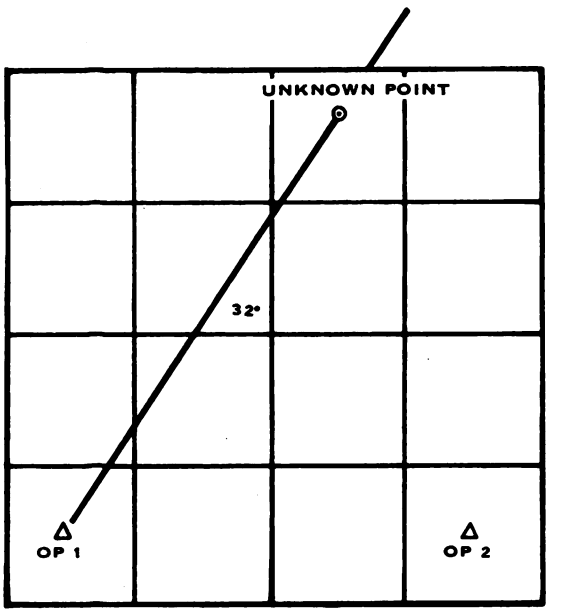
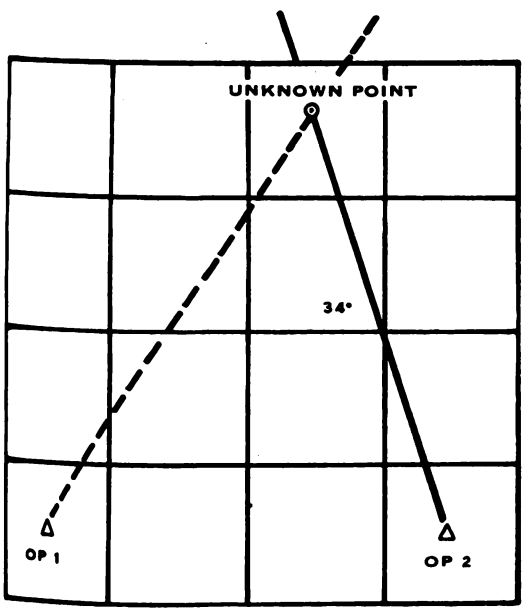


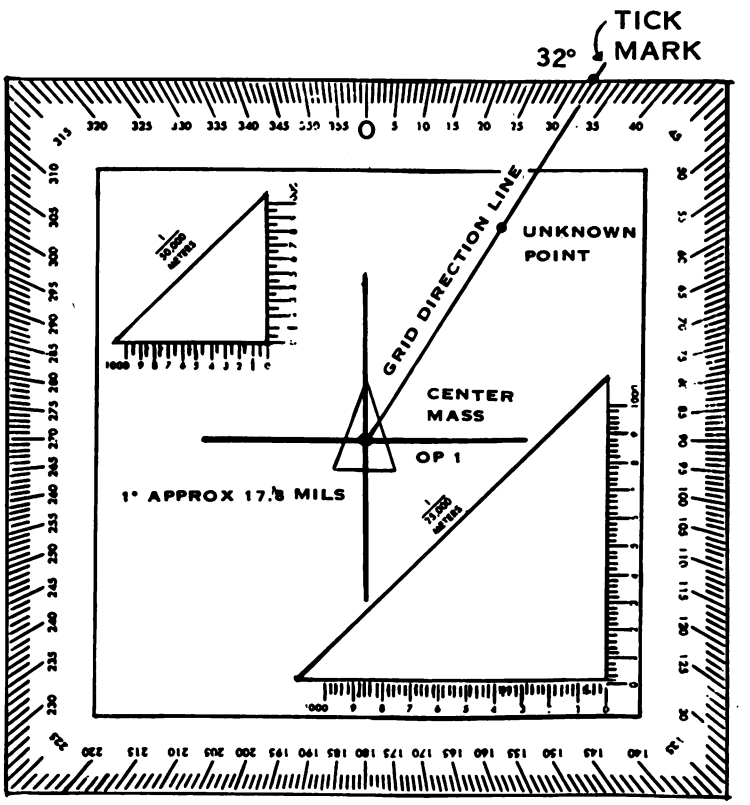
A.



B.



C.



D.

Figure 1

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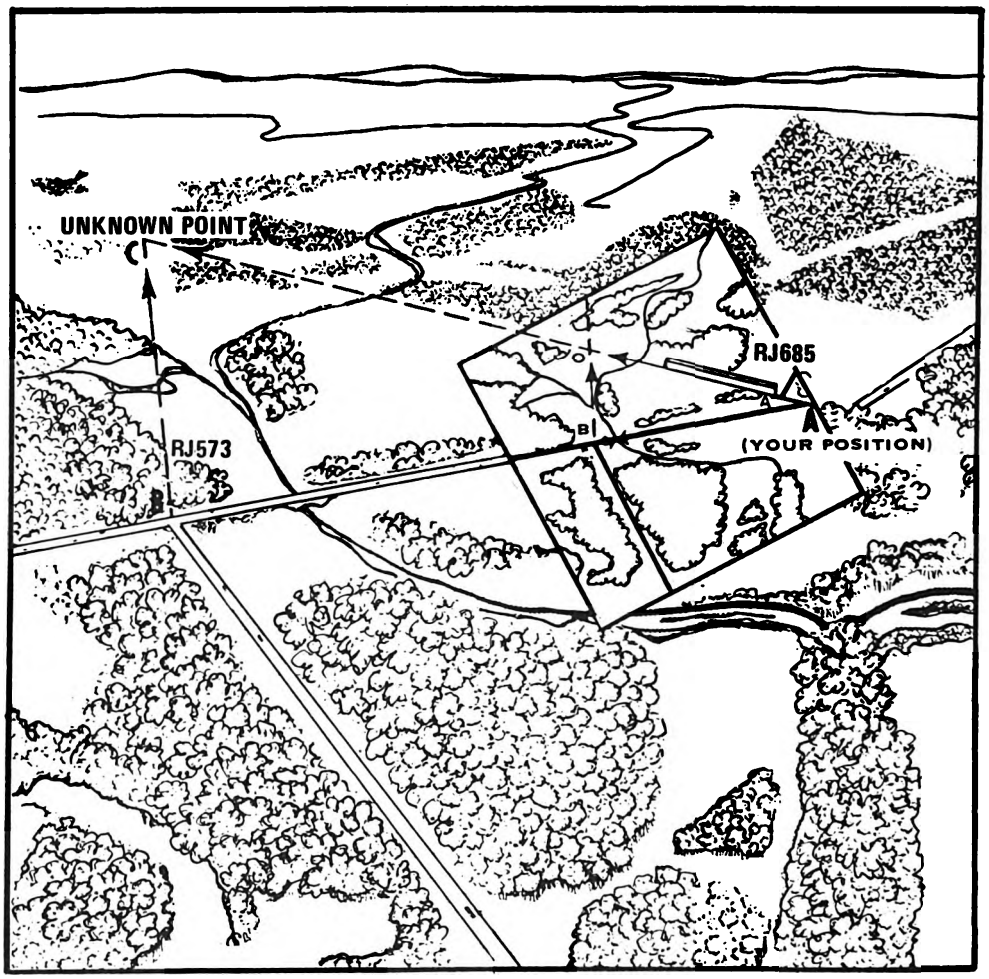

Figure 2. Intersection without compass.

TASK NUMBER: 071-11A-1014

REFERENCE:

FM 21-26, Map Reading

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TRAINING AND EVALUATION OUTLINE

TASK

LOCATE AN UNKNOWN POINT ON A MAP OR ON THE GROUND BY RESECTION

EVALUATION

CONDITIONS:

In the field at an unknown location, given a 1:50,000 map of the area, a lensatic compass, straightedge,coordinate scale, pencil, and two terrain features visible from your location and identifiable on the map.

STANDARDS:

Within 7 minutes determine the 100,000 meter square identification letters and 6-digit coordinates of your location to within 100 meters of the actual grid coordinates.

TRAINING

RESECTION is a way to locate one's position on a map. Magnetic azimuths are measured to two points on the ground which can be identified on the map. These magnetic azimuths are changed to grid azimuths, and the back azimuths of these grid azimuths are determined. Next, the converted back azimuths are drawn from the known points on the map. Where these two/three lines resect (cross) is your location.

1. Map and Compass Method (figure 1).

NOTE: A 10° easterly G-M angle is used in the examples. Map not to scale.

STEP 1: Determine the G-M angle of the map that you are using.

STEP 2: Locate 2 known positions on the ground and mark them on your map (figure 1a).

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STEP 3: Measure the magnetic azimuth to one of the known locations: change this to a grid azimuth (figure 1b).

a. If it is a westerly G-M angle, subtract the number of degrees in the G-M angle to your magnetic azimuth.

b. If it is an easterly G-M angle, add the number of degrees in the G-M angle to your magnetic azimuth.

STEP 4: Change this grid azimuth to a back azimuth.

STEP 5: Place the protractor on the map insuring that the zero degrees indicator on the protractor is pointing to the top of the map (north) and the index point is placed center mass on this location. Place a tick mark on the number of degrees you want to plot. Remove protractor from the map and draw a line on the map from this position on the grid back azimuth you found, in the direction of your unknown position.

STEP 6: Repeat steps 3 through 5 for a second and third known position.

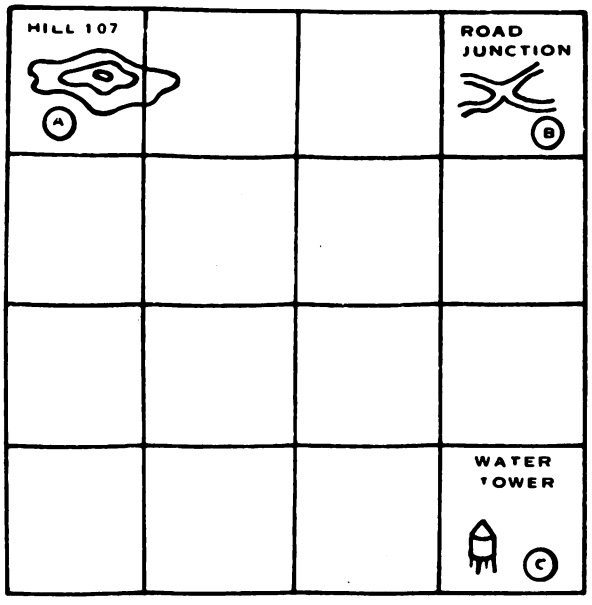

Figure 1a.

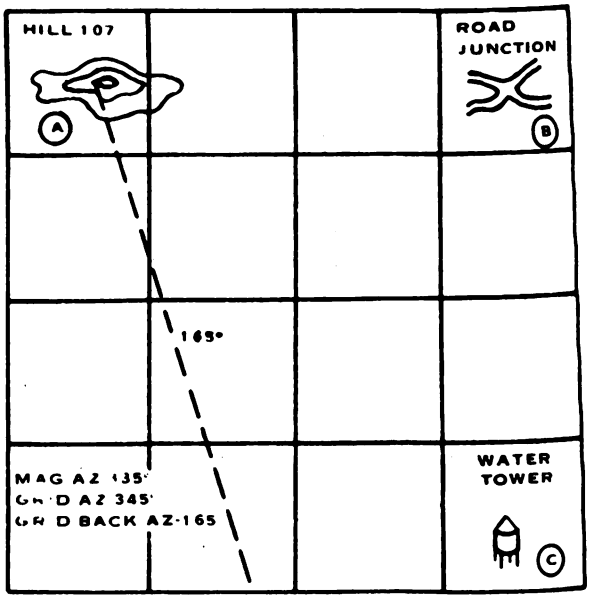

Figure 1b.

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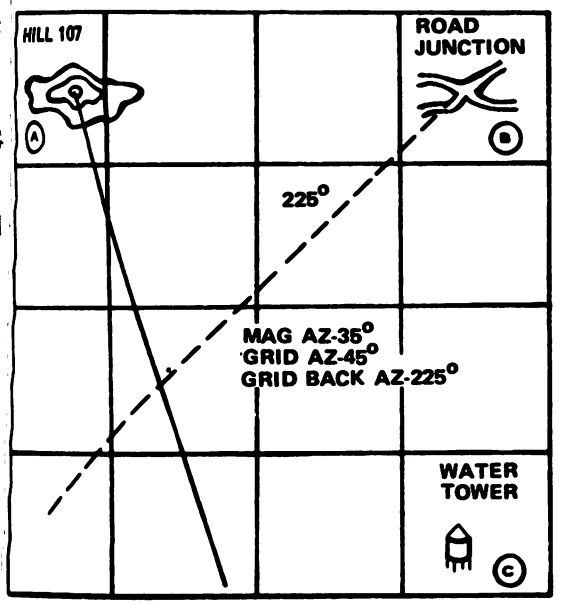

Figure 1c.

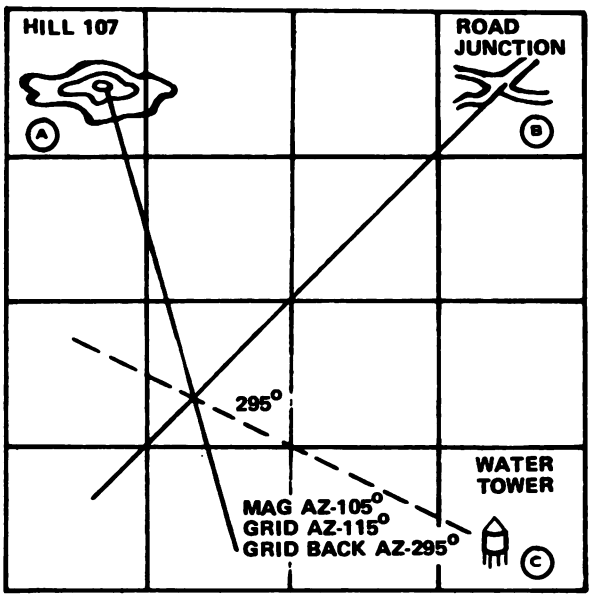

Figure 1d.

Figure 1.

STEP 7: The intersection of the lines is your location (figure 1d).

2. Straightedge method (when no compass is available) (optional).

a. Orient the map on a flat surface by the inspection method, (see task: Orient a map to the ground by map-terrain association).

b. Locate 2 or 3 known positions on the ground and mark them on the map.

c. Lay a straightedge on the map with the center of the straightedge at a known position as a pivot point and rotate the straightedge until the known position on the map is alined with the known positions on the ground.

d. Draw a line along the straightedge away from the known position on the ground toward your position.

e. Repeat c above using a second known position.

f. The intersection of the lines is your location.

TASK NUMBER: 071-11A-1015

REFERENCE:

FM 21-26, Map Reading

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TRAINING AND EVALUATION OUTLINE

TASK

PREPARE AND DETONATE A DEMOLITION CHARGE.

EVALUATION

CONDITIONS:

Situation 1: Given a ¼-pound of composition C4, a nonelectric blasting cap, a 6-foot length of time blasting fuse, an M60 fuse ignitor, a set of M2 cap crimpers, and a demolition pit.

Situation 2: Given a ¼-pound block of TNT, an electric blasting cap, 10-cap blasting machine, galvanometer, 50 feet of firing wire, and a demolition pit.

STANDARDS:

1. Prepare demolition charge safely to prevent premature detonation of the charge.

2. Prepare demolition charge in the following sequence to lessen chance of a misfire.

Situation 1:

1. Prepare a cap well in C4.

2. Test burn the time fuze to compute its burning rate.

3. Cut time fuze long enough to allow person to reach a safe distance before explosion.

4. Inspect cap well for dirt.

5. Place time fuze in cap well so that the freshly cut end is in contact with the flash charge of the cap.

6. Crimp the cap at a point ⅛ to ¼ of an inch from the open end.

7. Insert the cap into the C4.

8. Prepare M60 fuze ignitor by removing shipping plug.

9. Move to the demolition pit and fire the charge.

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Situation 2:

1. Lay out the firing wire from the demolition pit to the firing position.

2. Check galvanometer by holding a piece of metal across its terminals.

3. Separate the firing wire conductors at both ends, and touch those at one end to the galvanometer posts.

4. Check for a break by twisting the wires together at one end and touch those at the other end to the galvanometer posts.

5. Prepare cap well in ¼ pound of TNT.

6. Insert cap into cap well and secure with priming adapter.

7. Move to the demolition pit and splice lead wires of cap to firing wires. (Use Western Union "pigtail splice," figure 1.)

8. Move to the firing position and check entire circuit by touching the firing wires to the galvanometer posts.

9. Fasten firing wires to the posts of the blasting machine.

10. Operate the blasting machine to fire the charge.

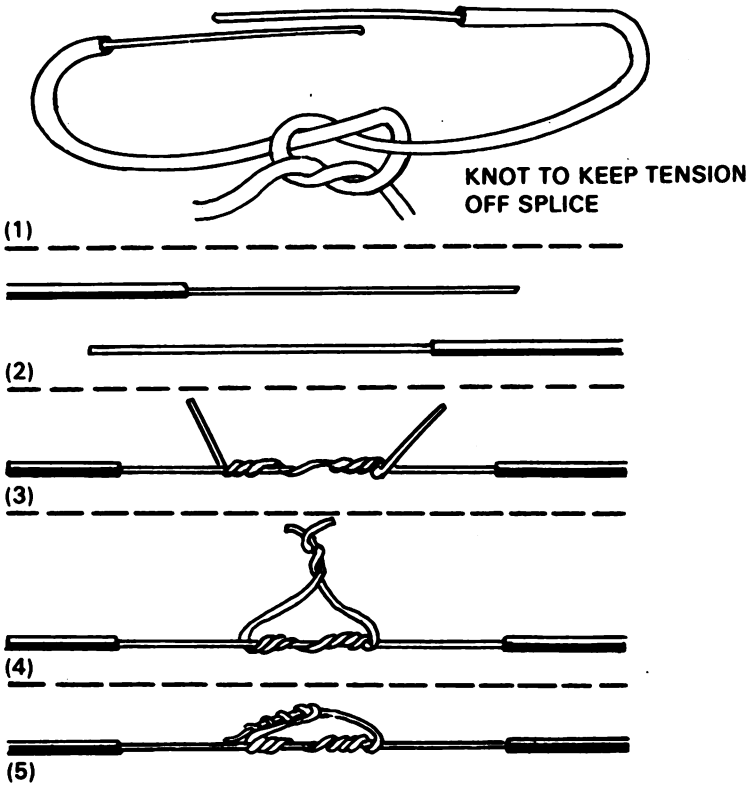

Figure 1.

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TRAINING:

Situation 1:

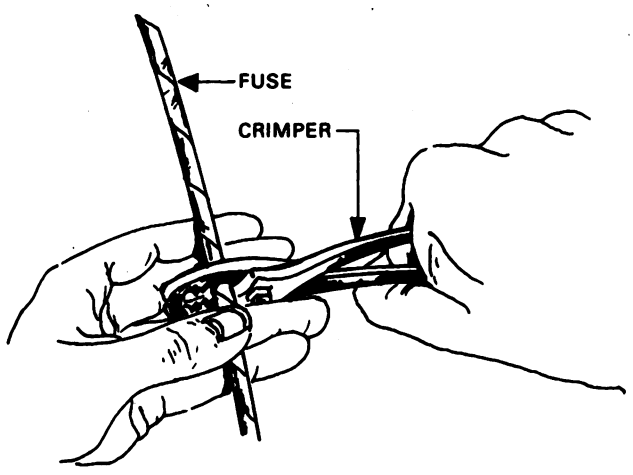
1. Using the pointed leg of the M2 cap crimper, punch a hole in the ¼ pound of C4 for the blasting cap. Hole should be at least 1/3 inch deep and ¼ inch in diameter.

2. Cut and discard a 6-inch length from the free end of the time blasting fuze to prevent a misfire caused by the exposed powder absorbing moisture from the air (figure 2).

3. Cut off a 3-foot length of time blasting fuze to check the burning rate. Light the end of the 3-foot length and note the time it takes to burn. Then compute the burning rate per foot by dividing the time in seconds by the length in feet (figure 3).

4. The time blasting fuze should be cut long enough to permit the person detonating the charge to reach a safe distance by walking at a normal pace before the explosion.

5. Take one blasting cap and inspect it by looking into the open end. If any foreign matter is present, hold it with the open end down, and shake it gently or bump the hand holding it against the other hand.



CUTTING THE FUSE

Figure 2.

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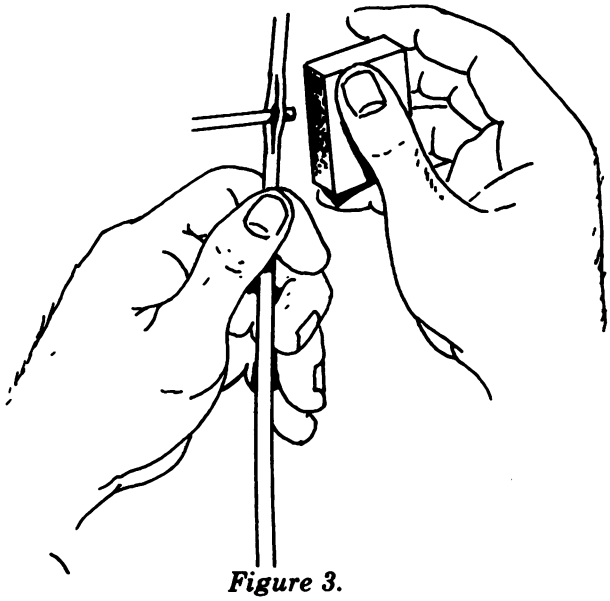

Figure 3.

6. Hold the time blasting fuze with the freshly cut end up and slip the blasting cap gently down over it so that the flash charge in the cap is in contact with the end of the time fuze.

7. After the blasting cap has been seated, grasp the time blasting fuze between the thumb and third finger of one hand and extend the forefinger over the end of the cap to hold it firmly against the end of the time fuze. Keep a slight pressure on the closed end of the cap (figure 4).

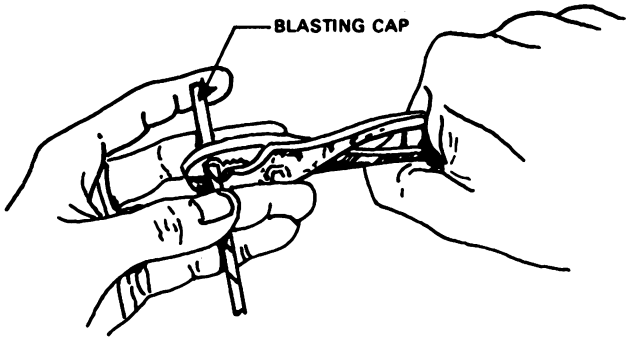

Figure 4.

8. Crimp the cap at a point ⅛ to ¼ of an inch from the open end. A crimp too near the explosive in the blasting cap may cause detonation. Point the cap out and away from the body during crimping (figure 5).

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9. Insert the blasting cap into the cap well in the C4 and mold the C4 around the cap.

10. Unscrew the fuze holder cap of the M60 fuze ignitor two or three turns, press the shipping plug into the ignitor to release the split, collect and rotate the plug as it is removed. Insert the free end of time fuze in place of the plug until it rests against the primer, and tighten the cap sufficiently to hold the fuze in place.

11. To fire, remove the safety pin, hold the barrel in one hand and pull on the pull ring with the other, taking up slack before making the final strong pull.

Situation 2:

1. After locating a firing position a safe distance away from the charge, lay out the firing wire from the charge to the firing position.

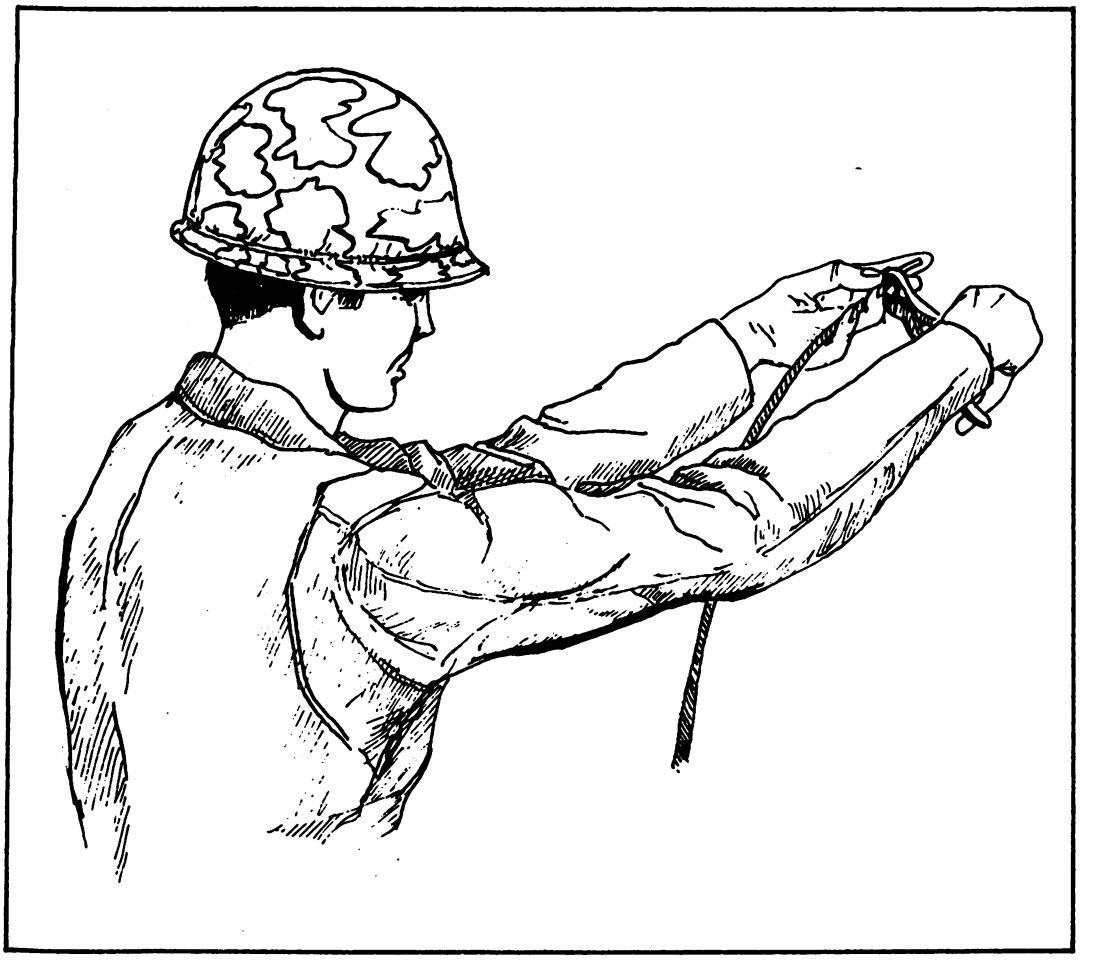

Figure 5.

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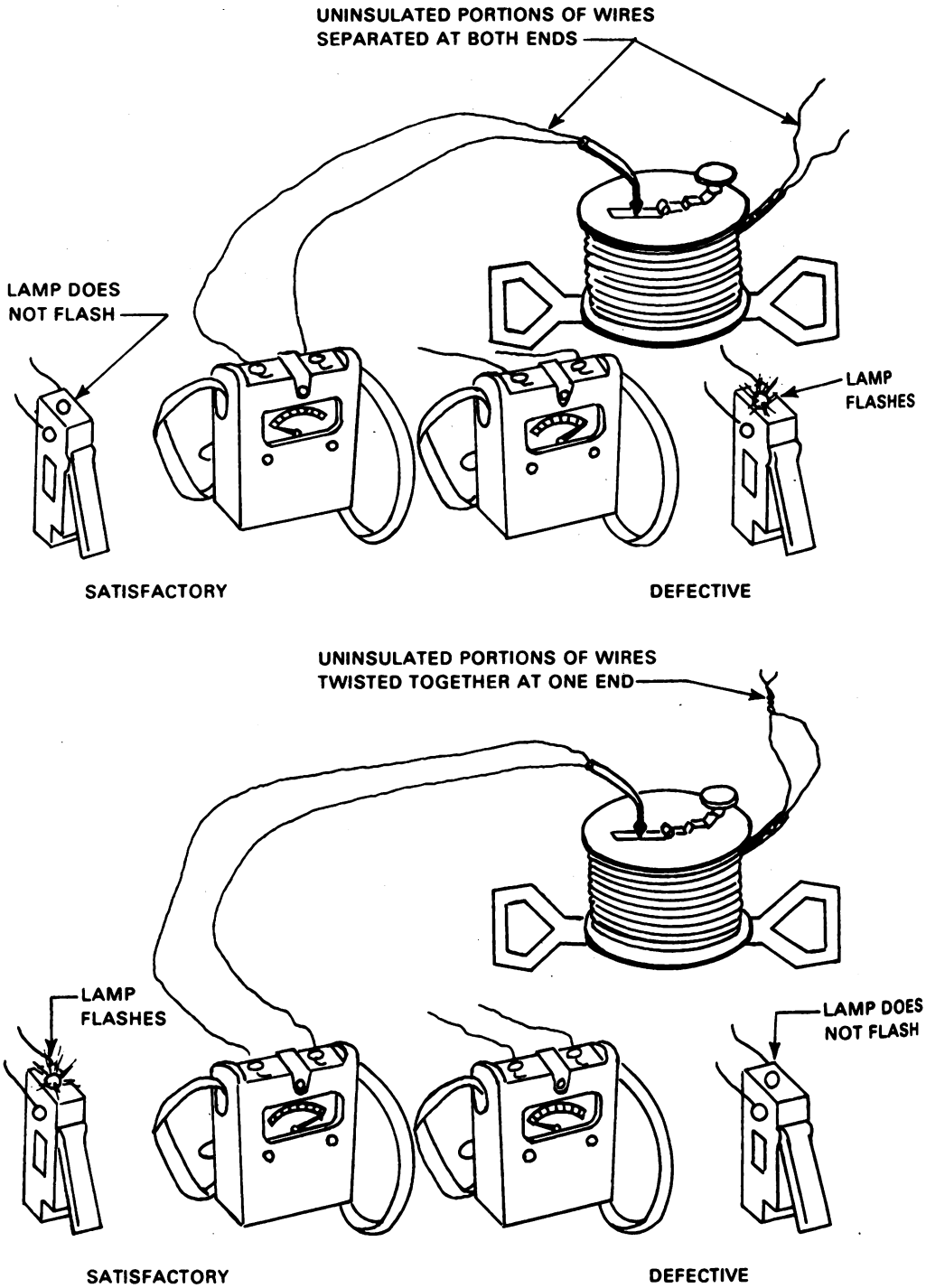

Figure 7.

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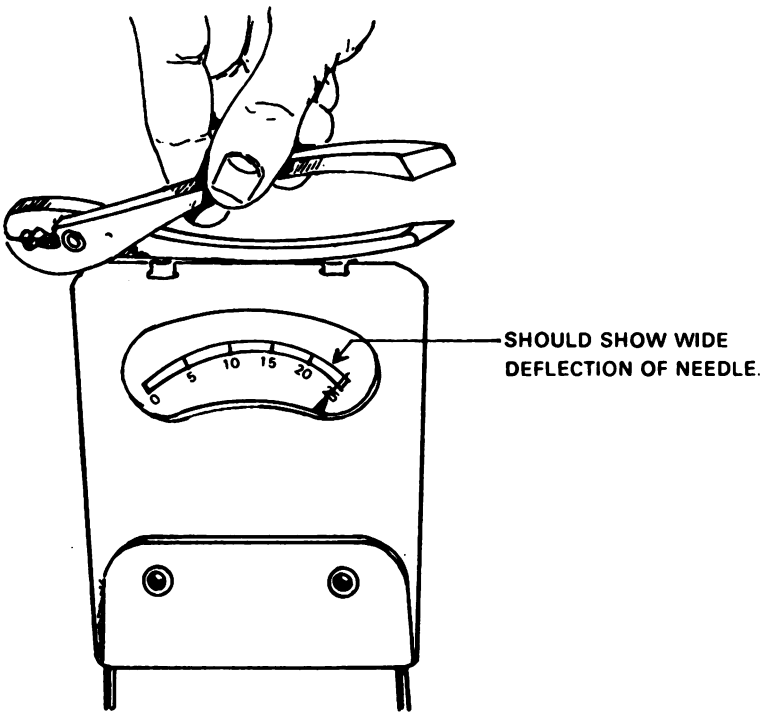

Figure 6.

2. When checking the galvanometer, the needle should have a deflection of approximately 25 units (figure 6).

3. When making the first galvanometer check, the needle should not move; if it does, the firing wire has a short circuit (figure 7).

4. When checking for a break, you should get a wide deflection of the needle (about 23 to 24 units). No movement of the needle indicates a break; a slight movement indicates a point of high resistance which may be caused by a dirty wire, loose wire connections, or wires with several strands broken off at connections.

5. If the shunt is not in place, twist the bare ends of the lead wire together.

6. When you move to the demolition pit, always take your power source with you.

7. When making the "Western Union pigtail splice," the wires should be scraped clean for the best possible electrical contact (figure 1).

8. Test-operate the blasting machine several times to insure that it operates properly.

TASK NUMBER: 071-11A-4601

REFERENCES:

FM 5-25, Explosives and Demolitions

TM 9-1375-203-15, Demolitions

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TRAINING AND EVALUATION OUTLINE

TASK

CLEAR DEMOLITION MISFIRES

EVALUATION

CONDITIONS:

Given a 1-pound electric or nonelectric primed charge, blasting machine, galvanometer, and a demolition pit with:

Situation 1: A nonelectric misfire.

Situation 2: An electric misfire.

STANDARDS:

Follow this sequence to clear misfires in order to lessen the chance of a premature detonation of the charge.

Situation 1:

1. Wait 30 minutes before investigation.
2. Place the 1-pound charge as close to the misfire as possible without disturbing it.
3. If the 1-pound charge is nonelectrically primed, light time fuse and move to a safe area.
4. If the 1-pound charge is electrically primed, move to the firing position and fire the charge.

Situation 2:

1. Check the firing wire connection to the blasting machine.
2. Make two or three more attempts to fire the circuits.
3. Attempt to fire again, using another blasting machine or power source.
4. Disconnect the firing wire from the blasting machine and shunt them.
5. Place the 1-pound charge as close to the misfire as possible without disturbing it.

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6. If the 1-pound charge is nonelectrically primed, light time fuze and move to a safe area.

7. If the 1-pound chrge is electrically primed, move to the firing position and fire the charge.

TRAINING

1. Working on or near a misfire is the most hazardous of all blasting operations.

2. Do not use blasting caps underground; use the detonating cord.

3. If possible, use dual firing systems to prevent the possibility of a misfire.

TASK NUMBER: 071-11A-4602
REFERENCE:

FM 5-25, Explosives and Demolitions

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TRAINING AND EVALUATION OUTLINE

TASK

PREPARE FDC ORDER.

EVALUATION

CONDITIONS:

Given a call for fire, plotted target, and a computer's record (DA Form 2399-R).

STANDARDS:

Fill out the FDC order portion of the computer's record (DA Form 2399-R) within 2 minutes.

TRAINING

As soon as a call for fire is received, the chief computer has the target plotted to see that it is within his area of responsibility and that it does not endanger friendly troops. He also checks what clearances are necessary. He considers whether the fire mission will support the overall mission of the unit, and whether the ammunition can be spared. If he decides to accept the mission, he decides how the target will be engaged. The FDC order (figure 1) is issued to the other members of the FDC as soon as it is prepared, to let them know how the mission will be conducted. It includes:

1. **MORT TO FFE (fire for effect).** Specifies which mortars will participate in the FFE. It can be the section, or any lesser combination of mortars.

2. **MORT TO ADJ (mortar to adjust).** Tells which mortar(s) will fire during the adjustment. For HE missions, it usually includes the base piece; for screening or illumination missions, a flank piece is normally used. If this line is the same as MORT TO FFE above, it may be left blank.

3. **METH OF ADJ (method of adjustment).** Gives the number of rounds to be fired from each adjusting mortar in each step of the adjustment, e.g., "1 round."

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4. **BASIS FOR CORR (basis for correction).** If registration corrections have been determined [several registration points (RP) may have been fired on], the point at which the corrections to be applied to this target were determined, e.g., "RP #1."

5. **SHEAF CORR (sheaf corrections).** Specifies any unusual sheaf to be fired, such as one converged on number 1 mortar or a sheaf fired at attitude 1650m.

6. **SHELL AND FUZE.** If the same type of fuze and shell will be fired in adjustment and FFE, the type is written on the first line. If different types are to be used, the type to be used to adjust is written on the first line with "in adj," and the type to be fired for effect, on the second line with "in FFE."

7. **METHOD OF FFE.** Tells the number of rounds to fire from each mortar in the FFE.

8. **RG/LATERAL SPREAD (range/lateral spread).** Used only with illumination ammunition. A range spread is two rounds, normally fired with the 2 and 3 mortars, spread (spacing depends on the type of ammunition) along the GT line. A lateral spread, normally fired with 1 and 3, is spread to the sides from the GT lines.

9. **ZONE.** 107-mm (4.2-in) only.

10. **TIME OF OPENING FIRE.** Tells what control the FDC is exercising over the section, e.g., AMC (at my command) or W/R (when ready).

CALL - FOR - FIRE	FDC ORDER	INITIAL FIRE COMMAND	RDS EXP
OP-1 ADJ FIRE DIRECTION 2900 RIGHT 70 ADD 200 PLATOON PATROL	MORT TO FFE ... SEC MORT TO ADJ ... #2 METH OF ADJ ... 1RD BASIS FOR CORR ... RP 1 SHEAF CORR ... SHELL & FUZE ... HE Q in ADJ PROX IN FFE METHOD OF FFE ... 3RD RG LATERAL SPREAD ... ZONE ... TIME OF OPENING FIRE ... W/R	MORT TO FOLLOW ... SECTION SHELL & FUZE ... HE QUICK MORT TO FIRE ... No. 2 METHOD OF FIRE ... 1 ROUND ... DEFLECTION ... 2681 CHARGE ... 3 ... TIME SETTING ... ELEVATION ... 1206	(1)

Figure 1. FDC order.

TASK NUMBER: 071-11C-1615

REFERENCE:

FM 23-91, Mortar Gunnery

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TRAINING AND EVALUATION OUTLINE

TASK

PREPARE FDC ORDER.

EVALUATION

CONDITIONS:

Given a call for fire, plotted target, and a computer's record (DA Form 2399-R).

STANDARDS:

Fill out the FDC order portion of the computer's record (DA Form 2399-R) within 2 minutes.

TRAINING

As soon as a call for fire is received, the chief computer has the target plotted to see that it is within his area of responsibility, and that it does not endanger friendly troops. He also checks what clearances are necessary. He considers whether the fire mission will support the overall mission of the unit, and whether the ammunition can be spared. If he decides to accept the mission, he decides how the target will be engaged. The FDC order (figure 1) is issued to the other members of the FDC as soon as it is prepared, to let them know how the mission will be conducted. It includes:

1. MORT TO FFE (fire for effect). Specifies which mortars will participate in the FFE. It can be the section, or any lesser combination of mortars.

2. **MORT TO ADJ (mortar to adjust).** Tells which mortar(s) will fire during the adjustment. For HE missions, it usually includes the base piece;

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for screening or illumination missions, a flank piece is normally used. If this line is the same as MORT TO FFE above, it may be left blank.

3. **METH OF ADJ (method of adjustment).** Gives the number of rounds to be fired from each adjusting mortar in each step of the adjustment, e.g., "1 round."

4. **BASIS FOR CORR (basis for corrections).** If registration corrections have been determined [several registration points (RP) may have been fired on], the point at which the corrections to be applied to this target were determined, e.g., "RP #1."

5. **SHEAF CORR (sheaf corrections).** Specifies any unusual sheaf to be fired, such as one converged on number 1 mortar or a sheaf fired at attitude 1650m.

6. **SHELL AND FUZE.** If the same type of fuze and shell will be fired in adjustment and FFE, the type is written on the first line. If different types are to be used, the type to be used to adjust is written on the first line with "in adj," and the type to be fired for effect, on the second line with "in FFE."

7. **METHOD OF FFE.** Tells the number of rounds to fire from each mortar in the FFE.

8. **RG/LATERAL SPREAD (range/lateral spread).** Used only with illumination ammunition. A range spread is two rounds, normally fired with the 2 and 3 mortars, spread (spacing depends on the type of ammo) along the GT line. A lateral spread, normally fired with 1 and 4, is spread to the sides from the GT lines.

9. **ZONE.** 107-mm (4.2-in) mortar only. When an area target is engaged, a zone may be fired to spread the FFE along the line of fire. By firing different charges on the rounds, they may be made to fall about 50 meters apart. Without extension, the charges are cut 3/8 charge apart; with extension, 4/8 apart. For a platoon-size target, the section fires three rounds for a 100-meter zone; for company, five rounds for a 200-meter zone.

10. **TIME OF OPENING FIRE.** Tells what control the FDC is exercising over the section, e.g., AMC (at my command) or W/R (when ready).

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CALL-FOR-FIRE	FDC ORDER	INITIAL FIRE COMMAND	RDS EXP
OP 3 ADJ FIRE DIR 0200 L100 + 400 DN 80 Co's IN OPEN FOX HOLES	MORT TO FFE ..... SEC MORT TO ADJ ..... #2 METH OF ADJ ..... 1 RD BASIS FOR CORR ..... RPI SHEAF CORR ..... SHELL & FUZE HEQ IN ADJ HE PROX IN FFE METHOD OF FFE ..... 5 RD RG LATERAL SPREAD ..... ZONE ..... 200 M TIME OF OPENING FIRE ..... W/R	MORT TO FOLLOW ..... SEC SHELL & FUZE ..... HEQ MORT TO FIRE ..... #2 METHOD OF FIRE ..... 1 RD 5 HE PROX IN FFE DEFLECTION ..... 2794 CHARGE ..... 1461 B ..... TIME SETTING ..... ELEVATION 0900	C

Figure 1.

TASK NUMBER: 071-11C-1614

REFERENCE:

FM 23-91, Mortar Gunnery

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TRAINING AND EVALUATION OUTLINE

TASK
RECORD METEOROLOGICAL (MET) DATA USING MET DATA SHEET.

EVALUATION

CONDITIONS:

Given DA Form 3675 and MET message.

STANDARDS:

Within 15 minutes, record MET message on DA Form 3675 without error.

TRAINING

1. The Ballistic MET Message.

a. To place fire on a target without adjustment, a mortar unit must know the exact location of the target, and be able to compensate for all nonstandard conditions. The re-registration is the most accurate method for determining and maintaining current firing corrections, but re-registration is not always practical. The ballistic MET message provides a means of determining the corrections necessary for changes in many of the conditions that affect the flight of rounds during the periods between registrations. These conditions include changes in powder temperature, projectile weight, air temperature and density, and the speed and direction of the wind, assuming that all other factors remain relatively constant until the section displaces.

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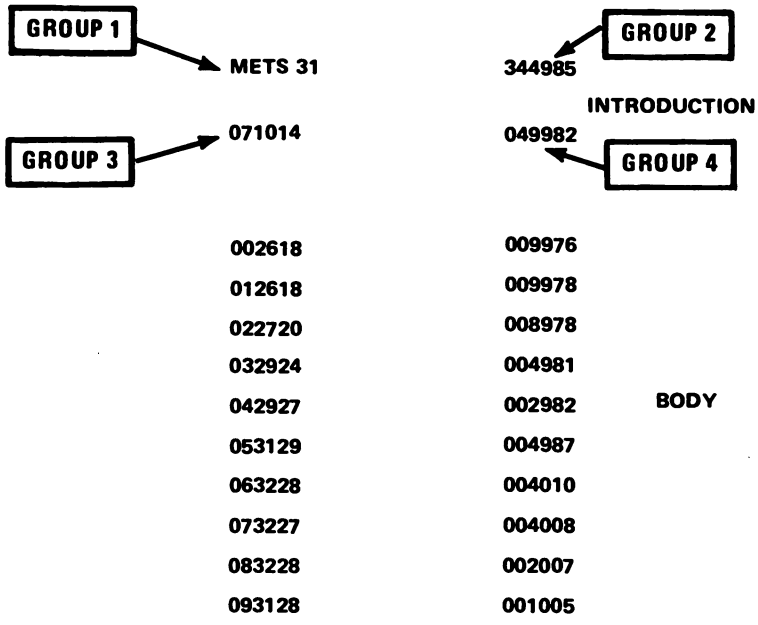

Figure 1. Sample Ballistic MET message.

b. The following paragraphs on the MET message provide FDC men with the rules and procedures for computation of the MET message. For the 107-mm (4.2-in) mortar, firing tables FT 4.2-H-2 provide MET information for M329A1 and M328A1 ammunition. In general, plus signs have been omitted from the firing tables; numbers without signs are considered positive.

c. By themselves, corrections computed from the MET message are not adequate firing corrections. To be of value to the FDC, a valid MET message must be received concurrent (within 4 hours) with a registration. The registration corrects for all nonstandard conditions; a MET received and computed concurrent with the registration tells the FDC how much of the total registration correction is attributable to weather. By comparing the corrections obtained from a later MET message, the FDC can modify the registration corrections to account for changes in weather. The use of MET corrections therefore eliminates the need for re-registration.

d. The Ballistic MET message (figure 1) has two parts; the introduction, which identifies and describes the MET station, and the body, containing meteorological data. MET messages can normally be obtained from the division artillery MET station every 4 hours. Since MET information is normally broadcast on AM radios, it will come to the FDC through battalion headquarters.

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2. Recording the MET Message (DA Form 3675).

a. Format of the MET Message. The MET message is broadcast in 6-character blocks, as shown in figure 2. The first four 6-character groups are known as the introduction, and are recorded on the top line of the recording form. The rest of the message is the body; two 6-character groups comprise each line of the body.

b. Introduction. The first four 6-character groups of the MET message are the introduction, identifying the type of message and the station transmitting the message. The recording of the introduction on DA Form 3675 (Ballistics MET Message) (figure 2), is discussed below. For a more detailed description of the meaning of each of the characters which make up the introduction, see the introduction section of the firing tables. The meaning of the characters in the introduction recorded in figure 1 follows:

METS31 (Group 1)

MET ..... Indicates that the transmission is a MET message.

S..... Type fire: must be an "S" for surface-to-surface fire for the text of the message to be copied by the mortar FDC.

3..... Type msg: must be a "3" for the message to apply to mortars.

1..... Octant: indicates in which octant of the earth the MET station is located (for the key to the octant designation system, see the introduction section of the appropriate firing tables); 1 designates north latitude, 90° to 180° west longitude.

344985 (Group 2)

344 ..... Indicates the latitude of the MET station expressed in degrees and tens of minutes: hence, 344 = latitude 34° 40′.

985 ..... Indicates the longitude of the MET station expressed in degrees and tens of minutes. Whenever the longitude is equal to or greater than 100°, the first digit, 1, will be omitted; for example, 053 = 105° 30′. The octant specified in Group 1 tells the FDC whether the station is located in north or south latitude and east or west longitude.

071014 (Group 3)

07..... Indicates the day of the month the period of validity of the message begins; 07 = the seventh day of the month.

10..... Indicates in Greenwich Mean Time the hour at which the period of validity begins; 10 = 1000 hours GMT. Greenwich Mean Time must be converted to local time for local use.

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14 ..... Indicates the hour, GMT, at which the period of validity begins.

049982 (Group 4)

049 ..... Indicates the altitude of the MET station (also referred to as the meteorological datum plan, or MDP), recorded in tens of meters. The altitude should be written on the recording form exactly as it is received to avoid confusion; 049 written on the sheet means 490 meters.

982 ..... Atmospheric pressure at the MET station. This value is not used to determine MET corrections for mortars, but is recorded to avoid confusion in recording the message.

c. Body. The atmosphere is divided into height zones parallel to the meteorological datum plane, as depicted in figure 3. Meteorological conditions are determined for each height zone and recorded in two 6-digit groups. The data for each zone is numbered, beginning at 00 for the zone containing the MET station, and recorded on the line bearing the corresponding number. The data for line C3 is shown below as an example.

032924

03 ..... The first two digits of any line in the body of the MET message indicate its line number. These numbers run sequentially from 00 (surface conditions) up to 15 (18,000 meters); however, with present ammunition only lines 00 through 06 are used since mortar projectiles never exceed the zone height corresponding to line 06. Record the entire MET message to reduce the chance of omitting significant data.

29 ..... Indicates the direction from which the ballistic wind is blowing. It is a grid azimuth expressed in hundreds of mils, e.g., 29 = 2900 mils.

24 ..... Indicates the speed of the ballistic wind expressed to the nearest whole knot; 24 = 24 knots.

004981

004 ..... Indicates the ballistic air temperature expressed to the nearest 0.1% of standard. When the value is equal to or greater than 100 (whenever the first digit transmitted is less than 4), the initial digit, 1, has been omitted in transmission. The computer recording the message may add the 1 for clarity if he desires to do so. Here, 004 = 100.4%.

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BALLISTIC MET MESSAGE

For use of this form, see FM 6-15; the proponent agency is United States Continental Army Command.

IDENTIFICATION	TYPE MSG	OCTANT	LOCATION $L_aL_aL_a$ or xxx	LOCATION $L_oL_oL_o$ or xxx	DATE YY	TIME (GMT) $G_0G_0G_0$	DURATION (HOURS) G	STATION HEIGHT (10's M) hhh	MDP PRESSURE % OF STD PPP
METB	K	Q							
METB	3	1	344985		07	1014		049	982

ZONE HEIGHT (METERS)	LINE NUMBER ZZ	BALLISTIC WINDS DIRECTION (100's MILS) dd	BALLISTIC WINDS SPEED (KNOTS) FF	BALLISTIC AIR TEMPERATURE (% OF STD) TTT	BALLISTIC AIR DENSITY (% OF STD) ΔΔΔ
SURFACE	00	26	18	009	976
200	01	26	18	009	978
500	02	27	20	008	978
1000	03	29	24	004	981
1500	04	29	27	002	982
2000	05	31	29	004	987
3000	06	32	28	004	010
4000	07	32	27	004	008
5000	08	32	28	002	007
6000	09	31	28	001	005
8000	10				
10000	11				
12000	12				
14000	13				
16000	14				
18000	15				

REMARKS

DELIVERED TO: RECEIVED FROM:	TIME (GMT)	TIME (LST)

MESSAGE NUMBER	DATE
RECORDER	**CHECKED**

DA FORM 1 JAN 3675 REPLACES DA FORM 6-57, 1 MAR 62, WHICH IS OBSOLETE.

Figure 2. Proper recording of a MET message on DA Form 3675

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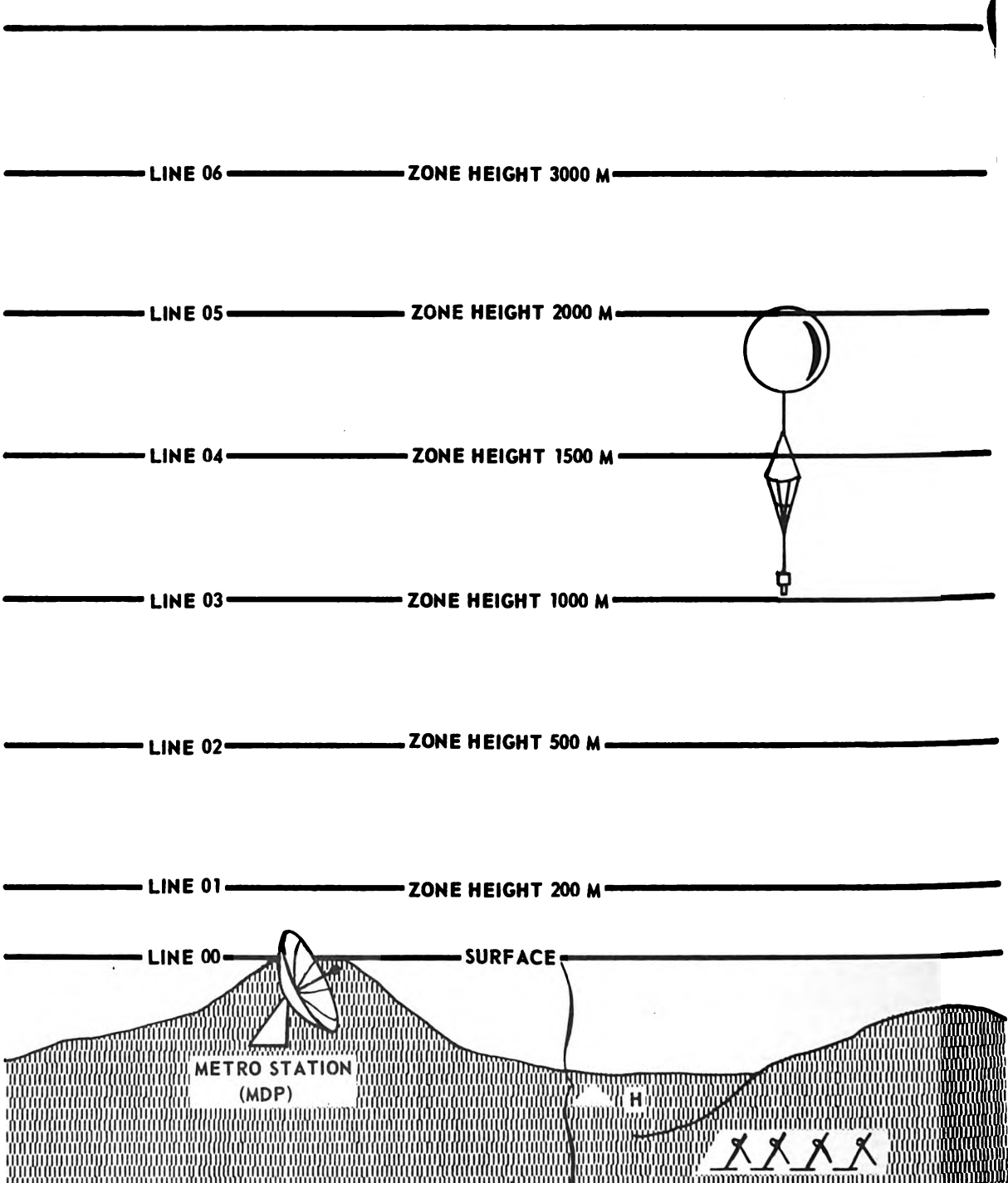

Figure 3. Zone height and difference in height.

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981---------- Indicates the ballistic air density expressed to the nearest 0.1% of standard. As with temperature, the initial 1 is omitted in transmission when the value equals or exceeds 100.0. In this case, 981 = 98.1%.

d. Corrections and Omissions. At the end of the transmission of a MET message, the recorder checks to see that his copy is complete. The format of the message enables the recorder to ask for a repetition of only the part he has missed, as in SAY AGAIN INTRODUCTION, or SAY AGAIN LINE 04. When his copy is complete, the recorder reads back the entire message to check it for errors. If line 05 has been recorded incorrectly, the transmitting station would catch the error and report WRONG, LINE 05: 053129 004987.

TASK NUMBER: 071-11C-1617

REFERENCE:

FM 23-91, Mortar Gunnery

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TRAINING AND EVALUATION OUTLINE

TASK

DETERMINE AND APPLY MET FIRING CORRECTIONS.

EVALUATION

CONDITIONS:

Given DA Form 2601-1, completed DA Form 3675, and tabular firing tables.

STANDARDS:

Within 60 minutes, record and compute MET data corrections to apply to the nearest mil for deflection and 10 meters for range.

TRAINING

1. DA Form 2601-1 (Computing MET Data Corrections Sheets for Mortars).

a. Known Data. Known data is that which is available to the FDC prior to the receipt of a MET message. It is collected by the chief computer from his computers and the section sergeant, and recorded in the proper spaces on the MET data correction sheet when received. Known data consists of the following items:

(1) Charge. This is the most up-to-date firing data charge on the data sheet for the RP. This charge determines which line of the firing tables is consulted to determine the correction factors to be used, and which line of the MET message to use.

(2) Chart range. For purposes of applying MET corrections, the chart range is the distance measured on the firing chart between the plotted locations of the mortars and the RP.

(3) Elevation. The elevation used to determine the adjusted charge; corrections will be taken from the same section of the firing tables.

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(4) Direction of fire. For use with the MET measured to the nearest degree Fahrenheit or the mortars to the plotted location of the RP, rounded to the nearest 100 mils. It is measured from the firing chart -- or with a surveyed chart, it may be read from the mounting information at the top of the data sheet.

(5) Altitude. The altitude of the firing section is read from the data sheet, rounded to the nearest 10 meters, and recorded in the proper box.

(6) Powder temperature. The temperature of the ammunition propellant at the section is measured to the nearest degree Fahrenheit or centigrade. If the propellant temperature cannot be determined, air temperature can be substituted.

(7) Projectile weight. Projectile weights vary from lot to lot and among different types of ammunition. The weight, expressed in squares, is normally shown near the lot number. Two squares (2 □) have been set as standard projectile weight.

b. Computation. Once the known data has been recorded on the MET data correction sheet, the transmission of the MET message is awaited. The computation of the MET corrections is quick and more accurate if the computer has organized his thoughts and data before the message is received. Figure 1 shows a MET data correction sheet which indicates the sources, movements, and precisions of the data recorded on the sheet. The following is a guide for organizing MET computations:

(1) Any known data not previously recorded should be written in the proper spaces prior to receipt of the MET message.

(2) Enter the proper subsection of the firing tables, find the firing charge in column 2, read across to find which line of the MET message to use (column 6).

(3) After the MET message is received and recorded on DA Form 3675, extract the information contained in the introduction of the message and in the line of the body determined above, and record this information in the proper spaces of the MET data correction sheet.

(4) Compute corrected values for air temperature and density; determine the chart direction of the wind and the corresponding wind components; and compute the deflection correction.

(5) Compute the MET range correction.

(6) The corrections for deflection and range are rounded to the nearest 1 mil and 10 meters, respectively, and recorded in the THIS MESSAGE box at bottom to determine the correction to apply.

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c. Example. The following known data will be used to compute corrections.

Adjusted charge	17 4/8
Chart range	2910 meters
Elevation	900 w/o ext.
Direction of fire	4320 m
Section altitude	460 meters
Ammunition	3 M329A1
Propellant temp	60° F.

d. Procedure for using DA Form 2601-1 to compute MET corrections.

(1) Known data. Record all known data in the spaces provided.

(2) Determination of line number. Enter Part I of the firing tables, the section for elevation 900 w/o ext., and search down column 2 until the adjusted charge (17 4/8) is found. Read across to column 6 (5 to FT 81-A1-3) to determine the line number of the MET message to use (in this case, 3).

(3) MET values. Record the data from the introduction and the appropriate line (03) of the MET message in the proper spaces on DA Form 2601-1 (figure 2). For brevity, the location of the MET station should remain as it appears in the MET message. All other data should be changed to read their actual values: altitude should be changed from 049 to 490; wind direction, from 29 to 2900. Values for the altitude of the MET station, wind direction, and wind speed are used in other sections of the sheet, and should be recorded in these other sections at this time.

(4) Temperature and density corrections. Determining H and corrected values for air temperature and density. H is the difference in altitude between the mortar section and the MDP; the sign is plus if the section is above the MDP and minus if it is below:

Altitude of the MDP	490	
-Altitude of mortars	460	
H	-30	(Section below MDP)

The H corrections modify the values of air temperature and density determined at the MET station to what they would be at the mortar section. The value for H is used to locate the appropriate corrections in table B (figure 3). Corrections for air temperature (T) and air density (D) are arranged in four double rows in the table. The numbers 0, +100-, +200-, +300-, located in the left column of the table represent H expressed in hundreds of meters; the numbers 0, +10-, through +90- across the top represent H in tens of meters. Where the proper hundreds row crosses the proper tens column, the corrections may be found. The

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numerical sign of the corrections will be the opposite of the sign of H. In the example H = -30, the corrections are found where the 0 row crosses the +30- column. The sign of H is minus, making the corrections plus: T is +0.1 and D is +0.3. Enter these in the spaces provided on the form and determine the corrected values for temperature and density (figure 3).

(5) Wind components. The wind direction should already have been entered in the proper space, and also the direction of fire. If the direction of fire is larger than the direction of the wind, add 6400 to the latter (4300 is larger than 2900; 2900 + 6400 = 9300). Subtract the direction of fire; the result is the chart direction of the wind (9300 - 4300 = 5000). Enter table A (figure 4) and find the chart direction of the wind just determined. Read across that row to find the cross wind and range wind components (LEFT 0.98 and HEAD 0.20); copy these in the proper spaces. Multiply the components by the wind speed to get lateral wind and range wind. The range wind (24 x L0 = L23.5) is multiplied by the correction factor corresponding to the adjusted charge (17 4/8) taken from table D (basic data), column 9 (1, figure 5) to get the deflection correction (L 23.5 x 0.9 = L 23.5) is multiplied by the correction (L 23.5 x 0.9 = L 21.2, which rounds to L 21). The result is moved to the bottom and placed in the THIS MESSAGE space for deflection correction.

(6) Range correction. All known values should already be written in the proper spaces except V, which is found as follows. The computer enters table C (figure 6) and finds the temperature closest to that recorded for the propellant (it may be either Fahrenheit or centigrade); V appears in the center column on the same line as the temperature. The computer now determines the amount by which these known values vary from the standard values upon which the firing tables are based. The variations from standard must be multiplied by correction factors from table D (figure 7) to convert them to range corrections in meters. Enter table D (correction factors) on the line corresponding to the adjusted charge (or the range corresponding to the adjusted charge) and find the correction factor for each variation from standard; enter the factor with its sign on the MET sheet. Multiply the variation from standard by the correction factor and place the result (rounded to the nearest whole meter) in the column with the same sign as the correction factor. When all of the corrections have been multiplied, sum the two columns and determine the net correction (36 in the example). Round the result to the nearest ten meters and write it in the range box for THIS MESSAGE.

(7) MET correction. The contribution of meteorological factors at the time the MET was computed in the amount recorded by THIS MESSAGE, here, L21, +40.

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2. Determining and Applying MET Firing Corrections.

a. Concurrent MET. If the MET is computer concurrent with a registration, the registration corrections compensate for ALL nonstandard conditions, and the MET merely tells how much of the corrections are the result of weather. In this case, the MET correction values are saved to be compared with values calculated several hours later. The values on the THIS MESSAGE line are recorded on the LAST MESSAGE line of the MET data correction sheet on which the next MET will be computed.

b. Subsequent MET. When a subsequent MET is received and computed, the MET corrections determined can be compared with the corrections determined from the preceding MET to find how much the weather effects on projectiles fired at the RP have changed. Since all other conditions are assumed to be constant, the difference in weather conditions is the only change to compensate for in updating firing corrections.

c. Determining the Correction to Apply. To calculate the correction to apply to the fire control equipment to compensate for meteorological changes, find the change from the LAST MESSAGE corrections to those for THIS MESSAGE. Example: Several hours later, another MET is computed, the corrections being L8, +100. These would appear on the bottom of the MET data correction sheet as follows:

	Deflection	Range
	L	+
(Concurrent MET) LAST MESSAGE	21	40
	R	-
	L	+
(1st Subsequent) THIS MESSAGE	8	100
	R	-
	L	+
CORR TO APPLY		
	R	-

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The change in the deflection correction is expressed as the direction and number of mils change from the concurrent MET (L21) to the 1st subsequent MET (L8). The horizontal scale of figure 7 illustrates a convenient method for determining the difference, in this case RIGHT 13. The range change is the difference between the range correction for the concurrent MET (+40) and that for the subsequent MET (+100). The vertical scale of figure 7 shows how to determine the range correction; here, +60. The completed MET CORR TO APPLY section would look like this:

	Deflection	Range
	L	+
LAST MESSAGE	21	40
	R	-
	L	+
THIS MESSAGE	8	100
	R	-
	L	+
CORR TO APPLY	13	60
	R	-

The method for placing the CORR TO APPLY (R13, +60) on the fire control equipment is described in d below. If several hours later another MET is received and calculated (call this the second subsequent MET), the corrections to apply would be calculated by finding the changes in deflection and range corrections between the first subsequent MET (which is now in the LAST MESSAGE box) and the second subsequent MET, using exactly the same method as was used before.

d. Applying MET corrections to fire control equipment. If the MET range correction to be applied is anything but 0, a new adjusted charge gageline will have to be drawn. The procedure for doing this follows:

(1) Add the MET range correction to be applied (subtract if the sign is minus) to the chart range to the RP recorded at the top of the MET data correction sheet.

(2) Index this range with the plastic cursor of the GFF (or GFS) and read the charge under the adjusted charge gageline (if there is no adjusted charge gageline, use the manufacturer's gageline). This is the new chart charge for firing at the RP.

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MET DATA CORRECTION SHEET FOR MORTARS

For use of this form, see FM 23–91; the proponent agency is U. S. Continental Army Command

CHART DATA			MET MESSAGE			
CHARGE FIRED AT RP DATA SHEET	CHART RANGE TO RP PLOTTING EQUIP	ELEVATION DATA SHEET	TYPE MET INTRO	STATION MET INTRO	DATE MET INTRO	
ALT OF MORTARS (m) DATA SHEET			TIME MET INTRO	ALT MDP MET INTRO	LINE NUMBER TABLE D, LINE 6	
ALT OF MDP		STATION HEIGHT IN INTRODUCTION OF MET	WIND DIRECTION MET BODY	WIND VELOCITY MET BODY	AIR TEMP MET BODY	AIR DENSITY MET BODY
ABOVE + SECTION MDP Δ H BELOW −		+SUBTRACT ALT OF MDP FROM −ALT OF MORTARS	Δ H CORRECTIONS		Δ^T + TABLE − B	Δ^D + TABLE − B
			CORRECTED VALUES		ALGEBRAIC SUM OF TWO BOXES ABOVE	ALGEBRAIC SUM OF TWO BOXES ABOVE

WIND COMPONENTS AND DEFLECTION CORRECTION

WHEN DIRECTION OF WIND IS LESS THAN DIRECTION OF FIRE ADD	6400
DIRECTION OF WIND	
DIRECTION OF FIRE	DATA SHEET (NEAREST 100)
CHART DIR OF WIND	

CROSS WIND ____ VELOCITY × L/R TABLE A COMPONENT = L/R NEAREST .1 LATERAL WIND KNOTS × TABLE D COL. 9 CORR FACTOR = NEAREST MIL DEFL CORR

RANGE WIND ____ VELOCITY × T/H TABLE A COMPONENT = T/H NEAREST .1 RANGE WIND KNOTS

MET RANGE CORRECTIONS

	KNOWN VALUE	STANDARD VALUES	VARIATION FROM STANDARDS	UNIT CORRECTIONS	PLUS	MINUS
POWDER TEMP SEC. SERGEANT	ΔV TABLE C	0	D I	TABLE D COL. 10 OR 11	ROUND	
RANGE WIND	T H	0	T H	TABLE D COL. 12 OR 13	RESULTS	
AIR TEMP		100	D I	TABLE D COL. 14 OR 15	TO	THE
AIR DENSITY		100	D I	TABLE D COL. 16 OR 17	NEAREST	
WT OF PROJECTILE	SECTION SERGEANT	2 ☐	D I	TABLE D COL. 18 OR 19	WHOLE	
MET CORRECTION TO APPLY				TOTAL	METER	
					SUBTOTAL	SUBTOTAL
					TOTAL	

	DEFL	RANGE
LAST MESSAGE	L R	+ −
THIS MESSAGE	L R NEAREST MIL	+ − NEAREST 10 METERS
CORR TO APPLY	L R	+ −

RANGE CORR

DA FORM 1 OCT 71 2601-1 REPLACES DA FORM 2601 1, 1 JUN 67, WHICH IS OBSOLETE.

Figure 1. DA Form 2601-1, Sources, movements, and precisions of data on the MET data correction sheet.

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MET DATA CORRECTION SHEET FOR MORTARS

For use of this form, see FM 23 – 91; the proponent agency is U. S. Continental Army Command

COMMAND DATA			MET MESSAGE			
CHARGE 17 1/8	CHART RANGE 2910	ELEVATION 900	TYPE S3	STATION 344 985	DATE 07	
ALT OF MORTARS (m)		460	TIME 1000-1400	ALT MDP 490	LINE NUMBER 03	
ALT OF MDP		490	WIND DIRECTION 2900	WIND VELOCITY 24	AIR TEMP 100.4	AIR DENSITY 98.1
SECTION ABOVE + / MDP / BELOW −	Δ H	+ ⊖ 30	Δ H CORRECTIONS		$\Delta T \oplus_{-} .1$	$\Delta D \oplus_{-} .3$
			CORRECTED VALUES		100.5	98.4

WIND COMPONENTS AND DEFLECTION CORRECTION

WHEN DIRECTION OF WIND IS LESS THAN DIRECTION OF FIRE ADD	6400
DIRECTION OF WIND	2900
	9300
DIRECTION OF FIRE	−4300
CHART DIR OF WIND	5000

CROSS WIND 24 (VELOCITY) x (L/R) .98 (COMPONENT) = (L/R) 23.5 (LATERAL WIND) KNOTS x 0.9 (CORR FACTOR) = L21 (DEFL CORR)

RANGE WIND 24 (VELOCITY) x (H) .20 (COMPONENT) (H) 4.8 (RANGE WIND) KNOTS

MET RANGE CORRECTIONS

	KNOWN VALUE	STANDARD VALUES	VARIATION FROM STANDARDS	UNIT CORRECTIONS	PLUS	MINUS
POWDER TEMP 60°F	ΔV −0.5	0	(D) I 0.5	+23.9	12	—
RANGE WIND	(T) (H) 4.8	0	(T) (H) 4.8	+5.1	24	—
AIR TEMP	100.5	100	(D) I 0.5	0	—	—
AIR DENSITY	98.4	100	(D) I 1.6	−6.7	—	11
WT OF PROJECTILE	30	2	(D) 10	+11	11	
MET CORRECTION TO APPLY				TOTAL	47	11
					11	
				RANGE CORR	36	

	DEFL	RANGE
LAST MESSAGE	L R	+ −
THIS MESSAGE	(L) R 21	⊕ − 40
CORR TO APPLY	L R	+ −

DA FORM 2601 – 1

Figure 2. DA Form 2601-1 (MET data correction sheet for mortars).

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TABLE B

AIR TEMPERATURE AND DENSITY CORRECTIONS

FT 4.2 - H - 2

900m/s

PROJECTILE, HE, M329A1
W/O EXTENSION
FUZE, PD, M557

CORRECTIONS TO TEMPERATURE (△ T) AND DENSITY (△ D), IN PERCENT, TO COMPENSATE FOR THE DIFFERENCE IN ALTITUDE, IN METERS, BETWEEN THE BATTERY AND THE MDP

△ H		0	+10	+20-	+30-	+40-	+50-	+60-	+70-	+80-	+90-
0	△ T	0.0	0.0	0.0	-0.1+	-0.1+	-0.1+	-0.1+	-0.2+	-0.2+	-0.2+
	△ D	0.0	-0.1+	-0.2+	-0.3+	-0.4+	-0.5+	-0.6+	-0.7+	-0.8+	-0.9+
+100-	△ T	-0.2+	-0.2+	-0.2+	-0.3+	-0.3+	-0.3+	-0.3+	-0.4+	-0.4+	-0.4+
	△ D	-1.0+	-1.1+	-1.2+	-1.3+	-1.4+	-1.5+	-1.6+	-1.7+	-1.8+	-1.9+
+200-	△ T	-0.5+	-0.5+	-0.5+	-0.6+	-0.6+	-0.6+	-0.6+	-0.7+	-0.7+	-0.7+
	△ D	-2.0+	-2.1+	-2.2+	-2.3+	-2.4+	-2.5+	-2.6+	-2.7+	-2.8+	-2.9+
+300-	△ T	-0.7+	-0.7+	-0.7+	-0.7+	-0.8+	-0.8+	-0.8+	-0.9+	-0.9+	-0.9+
	△ D	-3.0+	-3.1+	-3.2+	-3.3+	-3.4+	-3.5+	-3.6+	-3.7+	-3.8+	-3.9+

NOTE – △ H IS THE HEIGHT OF THE BATTERY, IN METERS, WITH REFERENCE TO THE MDP. IF THE BATTERY IS ABOVE THE MDP, USE THE SIGN THAT PRECEDES THE NUMBER. IF THE BATTERY IS BELOW THE MDP, USE THE SIGN THAT FOLLOWS THE NUMBER.

Figure 3. Table B, air temperature and density corrections.

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FT 4.2 – H – 2

PROJECTILE, HE, M329A1
W/O EXTENSION
FUZE, PD, M557

TABLE A

WIND COMPONENTS

900m/s

CORRECTION COMPONENTS OF A ONE KNOT WIND

CHART DIRECTION OF WIND MIL	CROSS WIND KNOT	RANGE WIND KNOT	CHART DIRECTION OF WIND MIL	CROSS WIND KNOT	RANGE WIND KNOT
0	0	H1.00	3200	0	T1.00
100	R.10	H.99	3300	L.10	T.99
200	R.20	H.98	3400	L.20	T.98
300	R.29	H.96	3500	L.29	T.96
400	R.38	H.92	3600	L.38	T.92
500	R.47	H.88	3700	L.47	T.88
600	R.56	H.83	3800	L.56	T.83
700	R.63	H.77	3900	L.63	T.77
800	R.71	H.71	4000	L.71	T.71
900	R.77	H.63	4100	L.77	T.63
1000	R.83	H.56	4200	L.83	
1100	R.88	H.47	4300	L.88	T.47
1200	R.92	H.38	4400	L.92	T.38
1300	R.96	H.29	4500	L.96	T.29
1400	R.98	H.20	4600	L.98	T.20
1500	R.99	H.10	4700	L.99	T.10
1600	R1.00	0	4800	L1.00	0
1700	R.99	T.10	4900	L.99	H.10
1800	R.98	T.20	5000	L.98	H.20
1900	R.96	T.29	5100	L.96	H.29
2000	R.92	T.38	5200	L.92	H.38
2100	R.88	T.47	5300	L.88	H.47
2200	R.83	T.56	5400	L.83	H.56
2300	R.77	T.63	5500	L.77	H.63
2400	R.71	T.71	5600	L.71	H.71
2500	R.63	T.77	5700	L.63	H.77
2600	R.56	T.83	5800	L.56	H.83
2700	R.47	T.88	5900	L.47	H.88
2800	R.38	T.92	6000	L.38	H.92
2900	R.29	T.96	6100	L.29	H.96
3000	R.20	T.98	6200	L.20	H.98
3100	R.10	T.99	6300	L.10	H.99
3200	0	T1.00	6400	0	H1.00

Figure 4. Table A - wind components.

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900 m

TABLE D

BASIC DATA

FT 4.2-H-2

CTG, HE, M32941
W O EXTENSION
FUZE, PD, M557

1	2	3	4	5	6	7	8	9
RANGE	CHARGE	D CHG PER 100 M DR	FS FOR GRAZE BURST FUZE M564	DR PER 1 8 INC D CHG	LINE NO.	TIME OF FLIGHT	AZIMUTH CORRECTIONS	
							DRIFT (CORR TO L)	CW OF 1 KNOT
M	INC	INC		M	NO.	SEC	MIL	MIL
2410	14	5/8	25.6	21	3	25.8	36.5	0.8
2430	14-1/8	5/8	25.7	21	3	25.9	36.7	0.8
2450	14-2/8	5/8	25.8	21	3	26.0	36.8	0.8
2470	14-3/8	5/8	25.9	21	3	26.2	36.9	0.8
2490	14-4/8	5/8	26.0	21	3	26.3	37.0	0.9
2510	14-5/8	5/8	26.2	21	3	26.4	37.2	0.9
2530	14-6/8	5/8	26.3	21	3	26.5	37.3	0.9
2550	14-7/8	5/8	26.4	21	3	26.6	37.4	0.9
2570	15	5/8	26.5	21	3	26.8	37.5	0.9
2590	15-1/8	5/8	26.6	21	3	26.9	37.6	0.9
2620	15-2/8	5/8	26.8	21	3	27.0	37.8	0.9
2640	15-3/8	5/8	26.9	21	3	27.1	37.9	0.9
2660	15-4/8	5/8	27.0	21	3	27.2	38.0	0.9
2680	15-5/8	5/8	27.1	21	3	27.3	38.2	0.9
2700	15-6/8	5/8	27.2	21	3	27.5	38.3	0.9
2720	15-7/8	5/8	27.3	21	3	27.6	38.4	0.9
2740	16	5/8	27.5	21	3	27.7	38.5	0.9
2760	16-1/8	5/8	27.6	21	3	27.8	38.7	0.9
2780	16-2/8	5/8	27.7	21	3	27.9	38.8	0.9
2800	16-3/8	5/8	27.8	21	3	28.0	38.9	0.9
2830	16-4/8	5/8	27.9	21	3	28.2	39.1	0.9
2850	16-5/8	5/8	28.0	21	3	28.3	39.2	0.9
2870	16-6/8	5/8	28.2	21	3	28.4	39.3	0.9
2890	16-7/8	5/8	28.3	21	3	28.5	39.4	0.9
2910	17	5/8	28.4	21	3	28.6	39.6	0.9
2930	17-1/8	5/8	28.5	21	3	28.7	39.7	0.9
2950	17-2/8	5/8	28.6	21	3	28.8	39.8	0.9
2970	17-3/8	5/8	28.7	21	3	29.0	40.0	0.9
3000	17-4/8	5/8	28.8	21	3	29.1	40.1	0.9
3020	17.5/8	5/8	29.0	21	3	29.2	40.2	0.9
3040	17-6/8	5/8	29.1	21	3	29.3	40.4	0.9
3060	17-7/8	5/8	29.2	21	3	29.4	40.5	0.9
3080	18	5/8	29.3	21	3	29.5	40.6	0.9
3100	18-1/8	5/8	29.4	21	3	29.6	40.8	0.9
3120	18-2/8	5/8	29.5	22	3	29.8	40.9	0.9
3150	18-3/8	5/8	29.7	22	3	29.9	41.0	0.9
3170	18-4/8	5/8	29.8	22	3	30.0	41.1	0.9

Figure 5. Table D - Basic data.

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FT 4.2-H-2

CTG, HE, M329A1
W O EXTENSION
FUZE, PD, M557

TABLE D

CORRECTION FACTORS

900m

1	10	11	12	13	14	15	16	17	18	19
RANGE	RANGE CORRECTIONS FOR									
	MUZZLE VELOCITY 1 M S		RANGE WIND 1 KNOT		AIR TEMP 1 PCT		AIR DENSITY 1 PCT		PROJ WT OF 1 SQ 2 SQ STD	
	DEC	INC	HEAD	TAIL	DEC	INC	DEC	INC	DEC	INC
M	M	M	M	M	M	M	M	M	M	M
2410	23.0	-22.6	3.8	-2.8	0.0	0.0	-4.5	4.6	-9	10
2430	23.1	-22.6	3.8	-2.8	0.0	0.0	-4.5	4.7	-9	10
2450	23.1	-22.7	3.9	-2.8	0.0	0.0	-4.6	4.7	-9	10
2470	23.1	-22.7	3.9	-2.9	0.0	0.0	-4.7	4.8	-10	10
2490	23.2	-22.8	4.0	-2.9	0.0	0.0	-4.8	4.9	-10	10
2510	23.2	-22.8	4.0	-2.9	0.0	0.0	-4.8	5.0	-10	10
2530	23.3	-22.8	4.1	-3.0	0.0	0.0	-4.9	5.1	-10	10
2550	23.3	-22.9	4.1	-3.0	0.0	0.0	-5.0	5.1	-10	10
2570	23.3	-22.9	4.2	-3.0	0.0	0.0	-5.1	5.2	-10	10
2590	23.4	-23.0	4.2	-3.1	0.0	0.0	-5.1	5.3	-10	10
2620	23.4	-23.0	4.2	-3.1	0.0	0.0	-5.2	5.4	-10	10
2640	23.4	-23.0	4.3	-3.1	0.0	0.0	-5.3	5.4	-10	10
2660	23.4	-23.1	4.3	-3.2	0.0	0.0	-5.4	5.5	-10	10
2680	23.5	-23.1	4.4	-3.2	0.0	0.0	-5.5	5.6	-10	10
2700	23.5	-23.1	4.4	-3.2	0.0	0.0	-5.5	5.7	-10	10
2720	23.5	-23.2	4.5	-3.3	0.0	0.0	-5.6	5.8	-10	10
2740	-23.6	-23.2	4.5	-3.3	0.0	0.0	-5.7	5.9	-10	10
2760	23.6	-23.2	4.6	-3.3	0.0	0.0	-5.8	5.9	-10	10
2780	23.6	-23.3	4.6	-3.4	0.0	0.0	-5.9	6.0	-10	10
2800	23.6	-23.3	4.6	-3.4	0.0	0.0	-5.9	6.1	-10	10
2830	23.7	-23.3	4.7	-3.4	0.0	0.0	-6.0	6.2	-10	10
2850	23.7	-23.4	4.7	-3.5	0.0	0.0	-6.1	6.3	-10	10
2870	23.7	-23.4	4.8	-3.5	0.0	0.0	-6.2	6.4	-10	11
2890	23.7	-23.4	4.8	-3.6	0.0	0.0	-6.3	6.5	-10	11
2910	23.8	-23.5	4.9	-3.6	0.0	0.0	-6.4	6.6	-10	11
2930	23.8	-23.5	4.9	-3.6	0.0	0.0	-6.4	6.7	-10	11
2950	23.8	-23.5	5.0	-3.7	0.0	0.0	-6.5	6.7	-10	11
2970	23.8	-23.6	5.0	-3.7	0.0	0.0	-6.6	6.8	-10	11
3000	23.9	-23.6	5.1	-3.7	0.0	0.0	-6.7	6.9	-10	11
3020	23.9	-23.6	5.1	-3.8	0.0	0.0	-6.8	7.0	-10	11
3040	23.9	-23.6	5.2	-3.8	0.0	0.0	-6.9	7.1	-10	11
3060	23.9	-23.7	5.2	-3.9	0.0	0.0	-7.0	7.2	-11	11
3080	23.9	-23.7	5.3	-3.9	0.0	0.0	-7.1	7.3	-11	11
3100	24.0	-23.7	5.3	-3.9	0.0	0.0	-7.2	7.4	-11	11
3120	24.0	-23.7	5.3	-4.0	0.0	0.0	-7.2	7.5	-11	11
3150	24.0	-23.8	5.4	-4.0	0.0	0.0	-7.3	7.6	-11	11
3170	24.0	-23.8	5.4	-4.0	0.0	0.0	-7.4	7.7	-11	11

Figure 5. Continued - Correction factors

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TABLE C

FT 4.2-H-2 PROPELLENT TEMPERATURE

PROJECTILE , HE, M329A1
W/P EXTENSION
FUZE, PD, M557

900m/s

CHANGES IN MUZZLE VELOCITY FOR PROPELLENT TEMPERATURE

TEMPERATURE OF PROPELLANT DEGREES F	CHANGE IN VELOCITY M/S	TEMPERATURE OF PROPELLANT DEGREES C
-40	-5.5	-40.0
-35	-5.2	-37.2
-30	-5.0	-34.4
-25	-4.7	-31.7
-20	-4.4	-28.9
-15	-4.2	-26.1
-10	-3.9	-23.3
-5	-3.7	-20.6
0	-3.4	-17.8
5	-3.1	-15.0
10	-2.9	-12.2
15	-2.6	-9.4
20	-2.4	-6.7
25	-2.1	-3.9
30	-1.9	-1.1
35	-1.7	1.7
40	-1.4	4.4
45	-1.2	7.2
50	-0.9	10.0
55	-0.7	12.8
60	-0.5	15.6
65	-0.2	18.3
70	0.0	21.1
75	0.2	23.9
80	0.5	26.7
85	0.7	29.4
90	0.9	32.2
95	1.1	35.0
100	1.3	37.8
105	1.6	40.6
110	1.8	43.3
115	2.0	46.1
120	2.2	48.9
125	2.4	51.7
130	2.6	54.4

Figure 6. Table C - propellant temperature.

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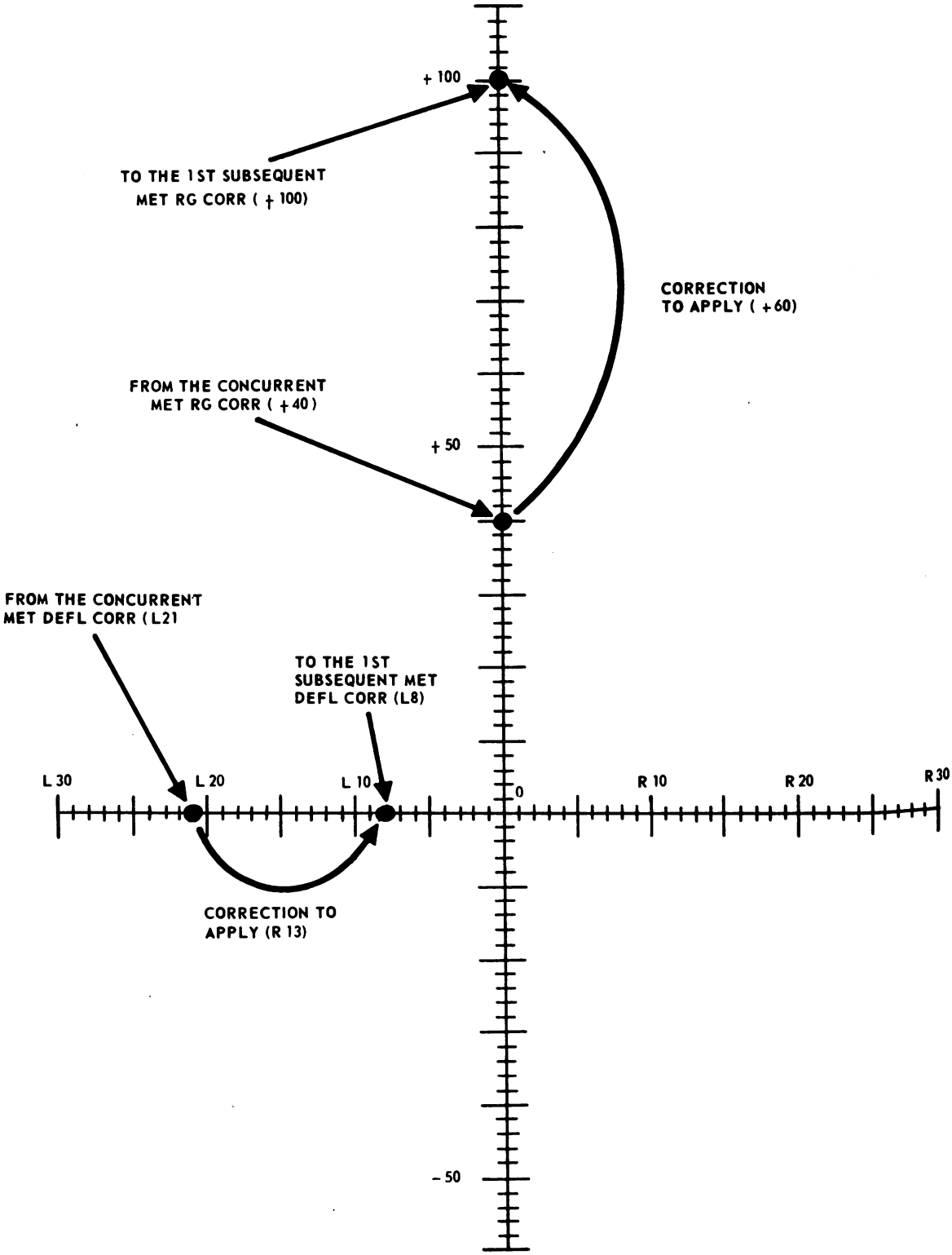

Figure 7. Graphical method for determining the MET corrections to apply to plotting equipment.

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(3) Return the cursor to the surveyed RP range and erase the old gageline.

(4) Draw the new adjusted charge gageline through the new chart charge for the RP determined in (2) above. Example: The chart range to the RP is 2910 meters, the old chart charge for the RP was 17 3/8, and the MET range correction to apply is +60. Adding 60 to 2910, the computer gets 2970; indexing it, he reads a charge of 17 6/8 under the gageline. He moves the cursor back to the RP (range) and draws the new adjusted charge gageline through charge 17 6/8. Applying the deflection correction is even simpler.

The computer applies the correction he determines algebraically to the numbering of all existing deflection corrections. For example, if the registration gave drift mark 40 a deflection correction of L23 and the MET deflection correction to apply was, as in the correction above, R13, the old and new deflection correction scales would look like the following:

Deflection correction scale after initial registration	L25	L24	L23	L22	L21	Defl corr
	42	41	40	39	38	Dft mark

Deflection correction scale after 1st subsequent MET	L12	L11	L10	L9	L8	Defl corr
	42	41	40	39	38	Dft mark

3. Updating Firing Data with MET Corrections. After the new firing corrections have been applied to the fire control equipment, it is possible to determine updated initial and firing data for all plotted targets. This should be done as soon as the situation permits. The procedure for updating target information is exactly the same as with re-registration corrections. The plotting pin is placed in a target location, and new chart data (charge) and corrections (deflection correction) are read from the firing chart. When the corrections are applied to the chart data on the data sheet, new firing data is produced.

TASK NUMBER: 071-11C-1618

REFERENCE:

FM 23-91, Mortar Gunnery

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TRAINING AND EVALUATION OUTLINE

TASK

OPERATE A RADIO/WIRE NET CONTROL STATION.

EVALUATION

CONDITIONS:

Given a radio/wire net to include receiving stations, radios, field telephones, CEOI and/or call signs and frequencies, and personnel to act as receiving stations.

STANDARDS:

Establish a radio/wire net making a communication check on both radio net and wire system using correct call signs for each receiving station within 10 minutes.

TRAINING

Field radio stations and wire systems are normally grouped into radio nets and wire systems. Each radio net is assigned one or more definite frequencies on which to operate. Each wire system is normally connected to next higher headquarters. Figure 1 shows a typical rifle company radio fire direction net. Figure 2 shows the wire system of a typical rifle company and weapons platoon. Fire direction net and wire system of a typical heavy mortar platoon, infantry battalion, are shown in figures 3 and 4.

TASK NUMBER: 071-11C-0952

REFERENCE:

FM 24-18, Field Radio Techniques

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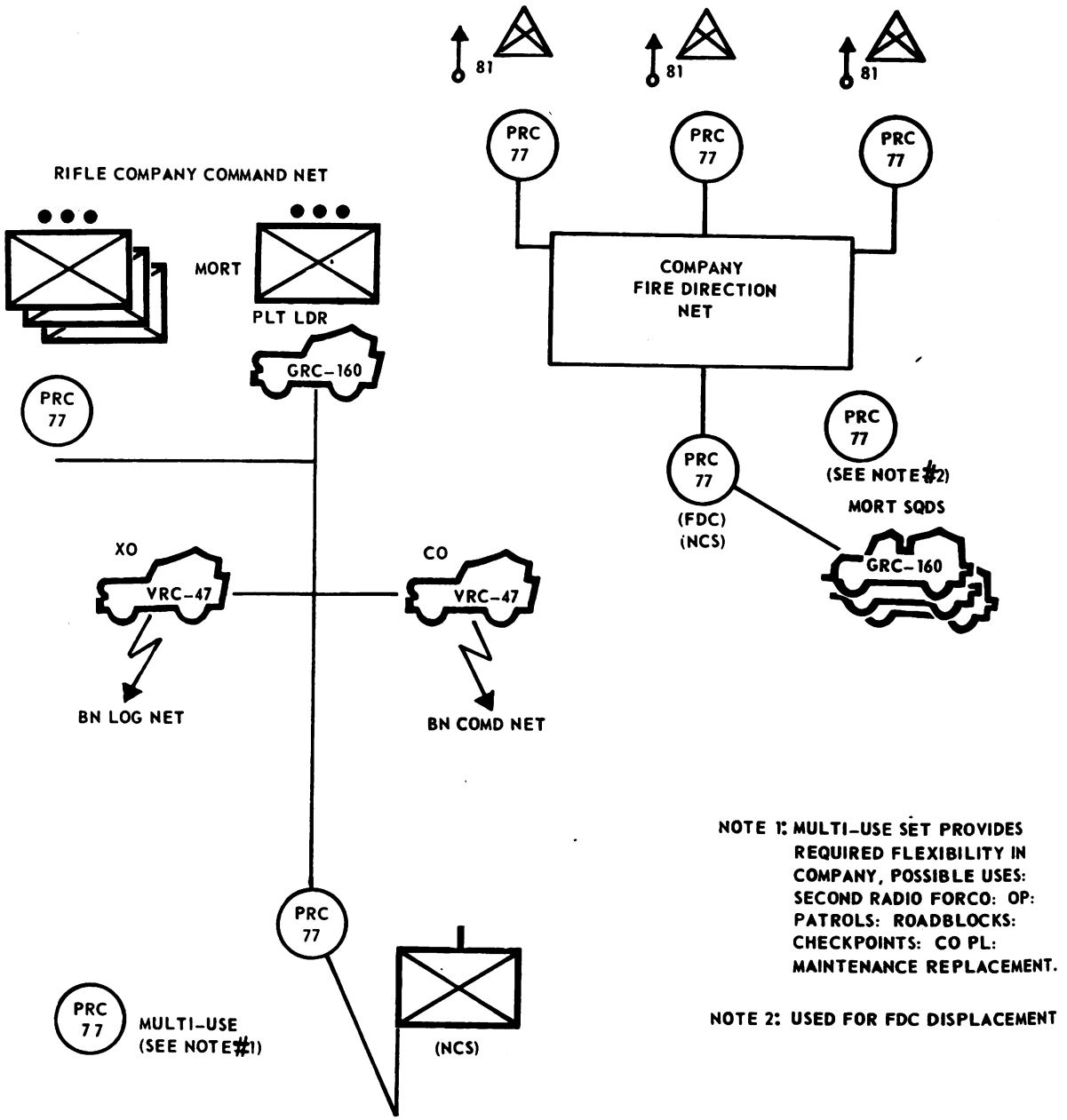

Figure 1. Rifle company and company fire direction nets.

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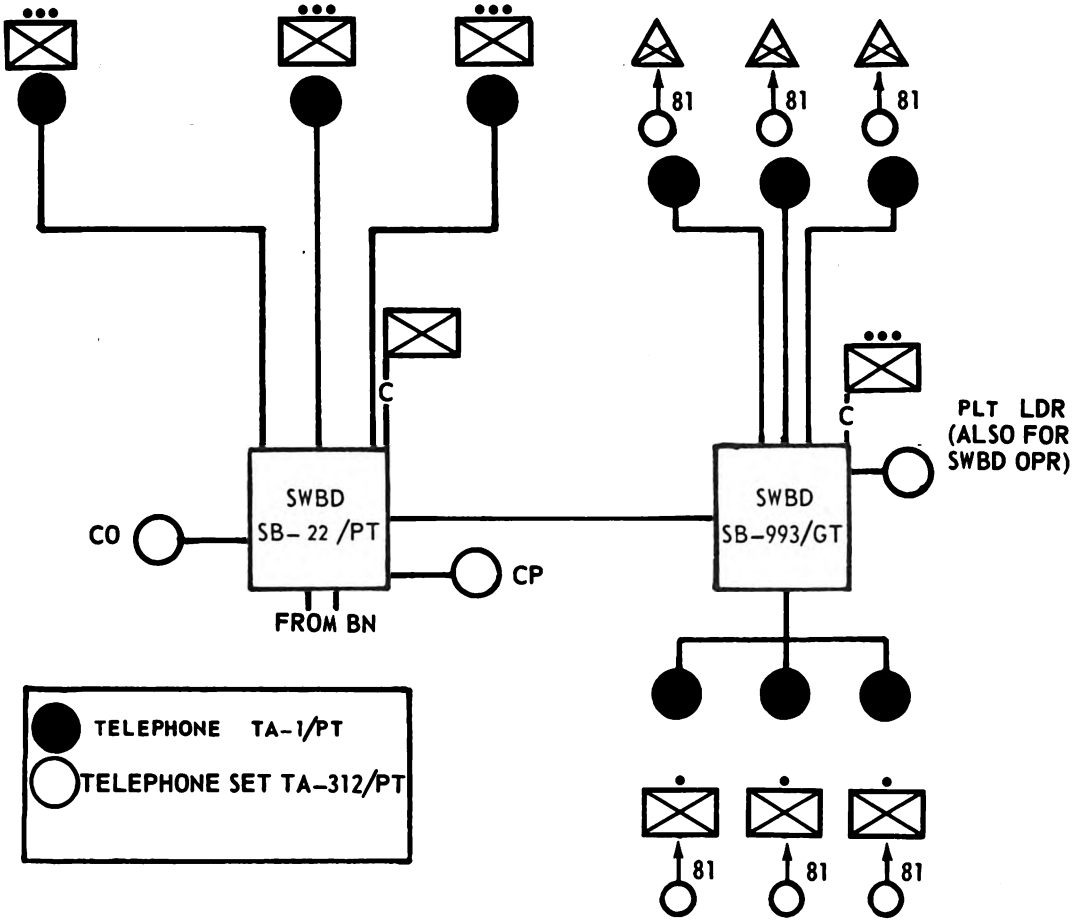

Figure 2. Rifle company and weapons platoon wire systems.

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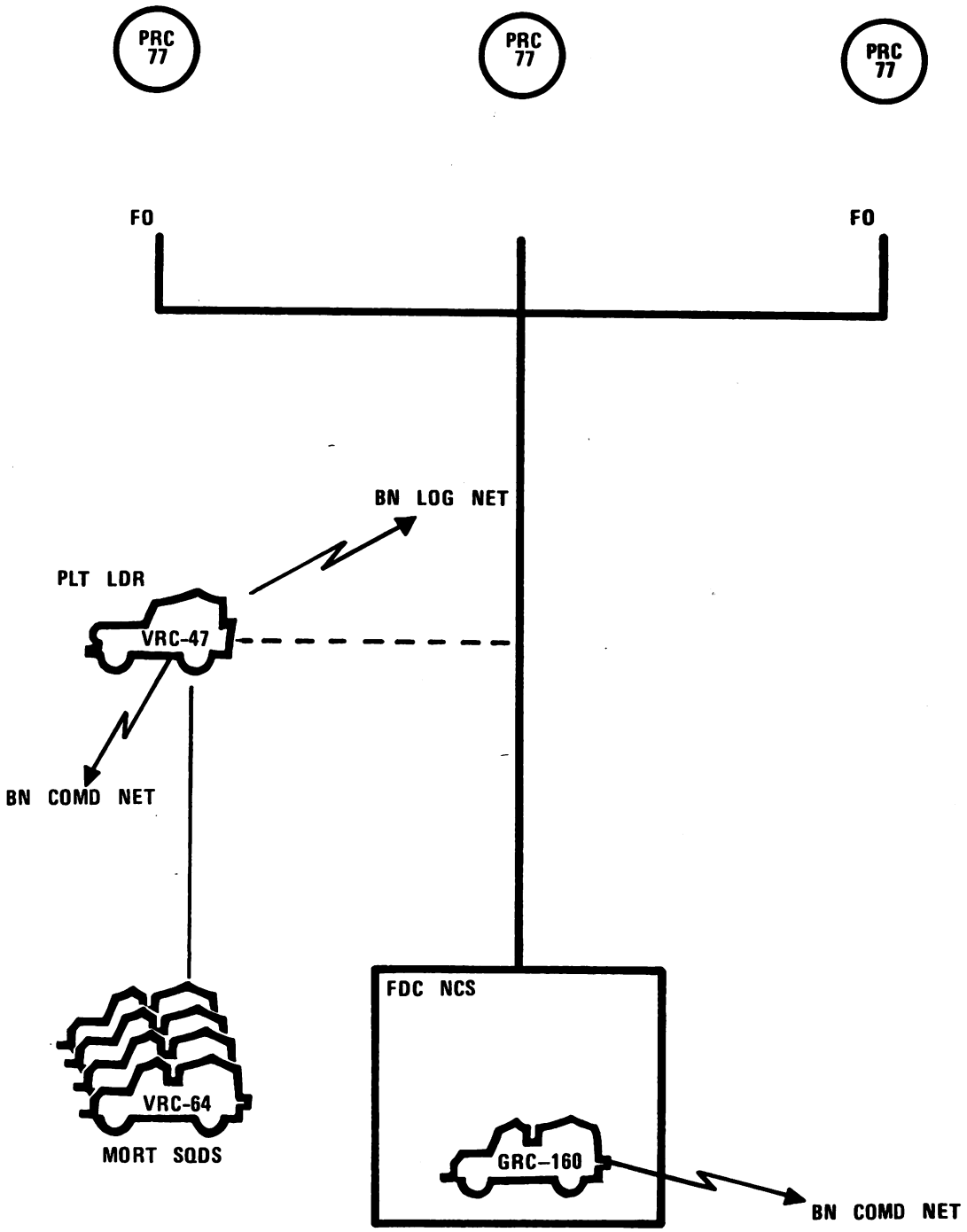

Figure 3. Type fire direction net, heavy mortar platoon, infantry battalion.

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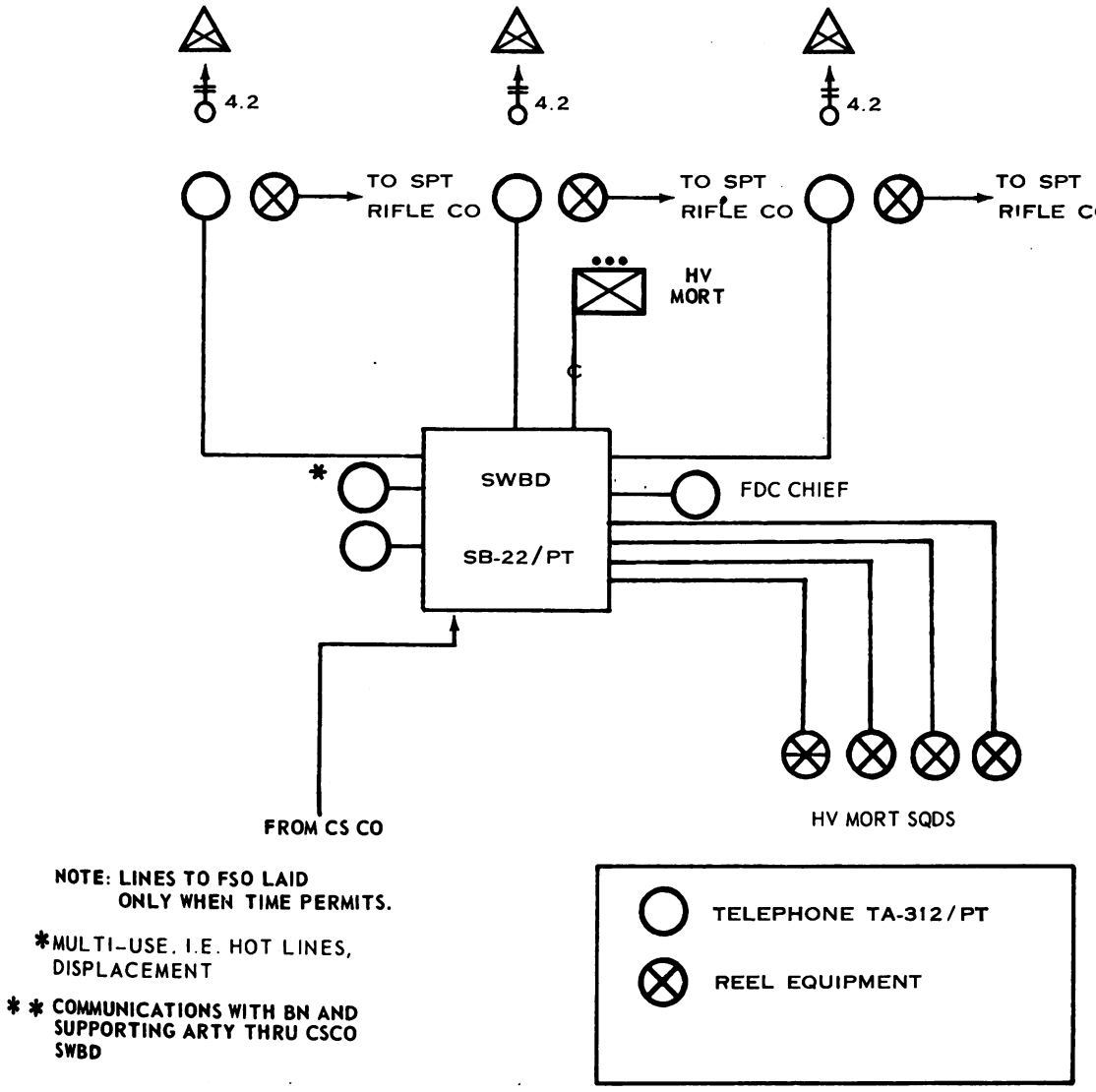

Figure 4. Type wire system, heavy mortar platoon, infantry battalion

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TRAINING AND EVALUATION OUTLINE

TASK

PREPARE/OPERATE SWITCHBOARD SB-993.

EVALUATION

CONDITIONS:

Given an SB-993, a radio/wire net CEOI, and/or call signs and frequencies, and 3 personnel with equipment to act as receiving stations.

STANDARDS:

Place the SB-993 into operation and make comm check with receiving stations within 5 minutes.

TRAINING

1. **General.** Manual telephone switchboards are designed for use in several types of operation, such as common battery (CB), local battery (LB), and common battery signaling (CBS). In a common-battery system, the source of electrical energy for speech and ringing signals is located at the switchboard telephone central. In a local-battery system, this source of electrical energy is supplied by the station (both the switchboard and the telephone set). In the other system (CB signaling, LB operation), the source of power for speech is part of the telephone set; the power for signaling the switchboard is located at the switchboard.

2. **Manual telephone switchboard SB-993/GT.** Manual telephone switchboard SB-993/GT (figure 1) is a light, portable local battery switching center normally used in company-size units. It consists of a plug holder and seven two-pronged adapter connectors U-184/GT in a case. A field telephone is required for the operator's use. The SB-993/GT may be used as an emergency field replacement for any local battery switchboard. Manual telephone switchboard SB-993/GT weighs 2¼ pounds. It will handle an operator's line and six local-battery wire circuits. Manual telephone switchboard SB-993/GT consists of --

a. A canvas carrying case to protect and carry the switchboard when not in use.

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b. An adapter connector holder to hold the adapter connectors in position for operation.

c. Seven adapter connectors U-184/GT, six of which are used to attach the six incoming wire circuits to the switchboard. The seventh adapter connector is connected to a field telephone for the switchboard operator.

d. A 7-foot mounting strap to secure the adapter connector holder to a tree or table for support when in use.

3. Adapter connector U-184/GT.

a. Each adapter connector U-184/GT consists of a neon glow lamp, two binding posts, two plugs, and two jacks, all molded together in a translucent plastic housing. The connectors serve as the thumbscrew ends of binding posts to which incoming lines are connected. The connectors may be inserted into the jacks of another adapter connector U-184/GT to connect two lines.

b. Several adapter connectors U-184/GT can be connected in tandem for conference connections (several separate parties conversing at the same time).

c. An incoming ringing signal lights the neon lamp in the switchboard plug connected to the line, for the duration of the signal. An audible signal is not heard when the neon lamp lights, unless the switchboard operator's telephone is connected to that line. Thus, the operator must be constantly watching for an incoming signal.

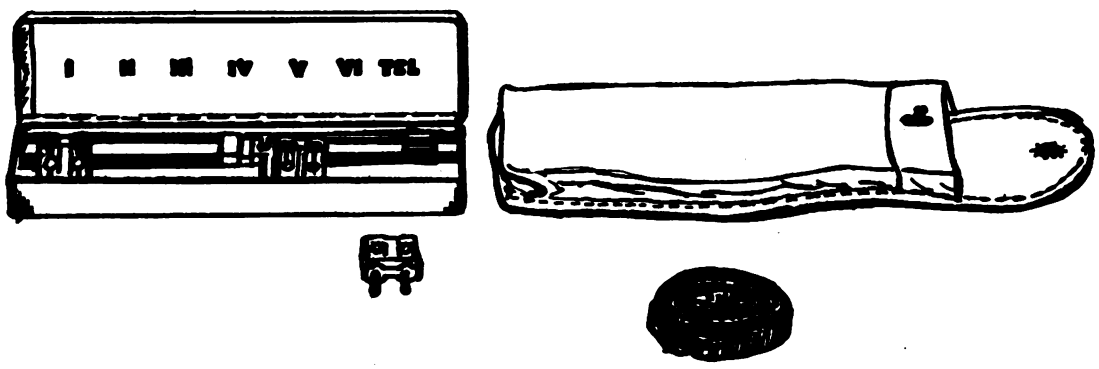

Figure 1.

TASK NUMBER: 071-11C-0950

REFERENCE:

FM 24-18, Field Radio Techniques

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TRAINING AND EVALUATION OUTLINE

TASK

PREPARE/OPERATE SWITCHBOARD SB-22/PT.

EVALUATION

CONDITIONS:

Given an SB-22/PT, a radio/wire net, CEOI and, or call signs and frequencies, and 3 personnel with equipment to act as receiving stations.

STANDARDS:

Place the SB-22/PT into operation and make commo check with receiving stations within 5 minutes.

TRAINING

1. **General.** Manual telephone switchboards are designed for use in several types of operation, such as common battery (CB), local battery (LB), and common battery signaling (CBS). In a common-battery system, the source of electrical energy for speech and ringing signals is located at the switchboard telephone central. In a local-battery system, this source of electrical energy is supplied by the station (both the switchboard and the telephone set). In the other system (CB signaling, LB operation), the source of power for speech is part of the telephone set; the power for signaling the switchboard is located at the switchboard.

2. **Manual telephone switchboard SB-22/PT.**

a. Manual telephone switchboard SB-22/PT (figure 1) is a piece of single-position field equipment, used in field wire systems. It is small, lightweight, portable, and immersion-proof, and it needs no special mounting equipment for operation.

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b. The switchboard can interconnect local-battery telephone lines, voice-frequency teletypwriter circuits, and remote-control circuits for radio communication. Each switchboard has a capacity for switching 12 field telephones.

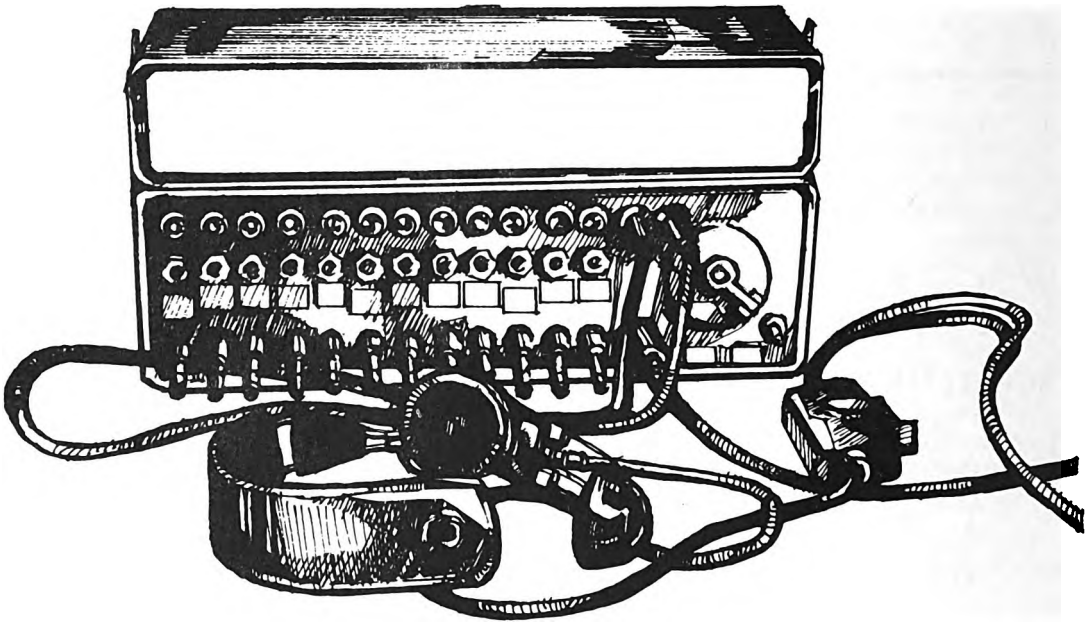

Figure 1. Switchboard SB-22/PT.

TASK NUMBER: 071-11C-0951

REFERENCE:

FM 24-18, Field Radio Techniques

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TRAINING AND EVALUATION OUTLINE

TASK

DECLINATE M2 AIMING CIRCLE.

EVALUATION

CONDITIONS:

Given M2 aiming circle, with accessories and declination station with a minimum of two known directions.

STANDARDS:

Declinate the M2 aiming circle to an accuracy of 1 mil within 10 minutes.

TRAINING

1. When to declinate the aiming circle:

   a. When it is moved 25 miles (40 kilometers) or more from area in which last declinated.

   b. After an electrical storm or after receiving a severe shock such as being dropped from a truck to the ground.

   c. Every 30 days.

   d. When it is initially received or returned from maintenance.

2. Declinating the aiming circle:

   a. Set up aiming over declinating station using plumb bob (figure 1).

   b. Set the known grid azimuth on instrument.

   c. Place vertical crossline on left edge of the azimuth mark.

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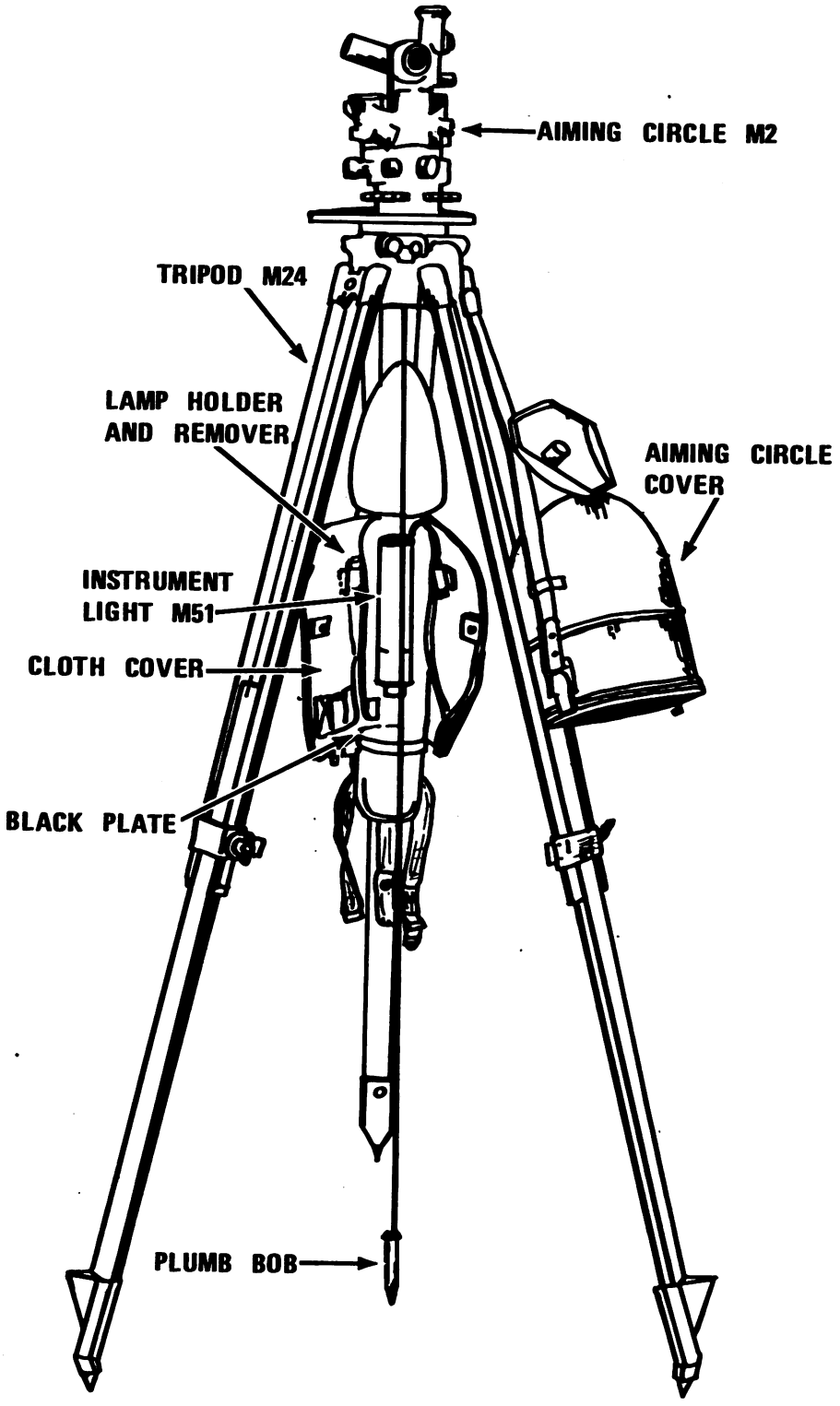

Figure 1. M2 aiming circle with accessory equipment.

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d. With the recording motion, rotate the instrument to zero. Release needle, look through magnifier and, using azimuth micrometer, center the needle (figure 2).

e. Determine declination constant from the azimuth scales to the nearest 0.5 mils. Relock the needle.

f. Use above procedure to determine declination constant to the remainder of azimuth mark(s).

g. Compare the declination constants to all azimuths. If they agree within 2 mils, determine the average and record it to the nearest 1 mil. If they vary more than 2 mils, repeat the entire process.

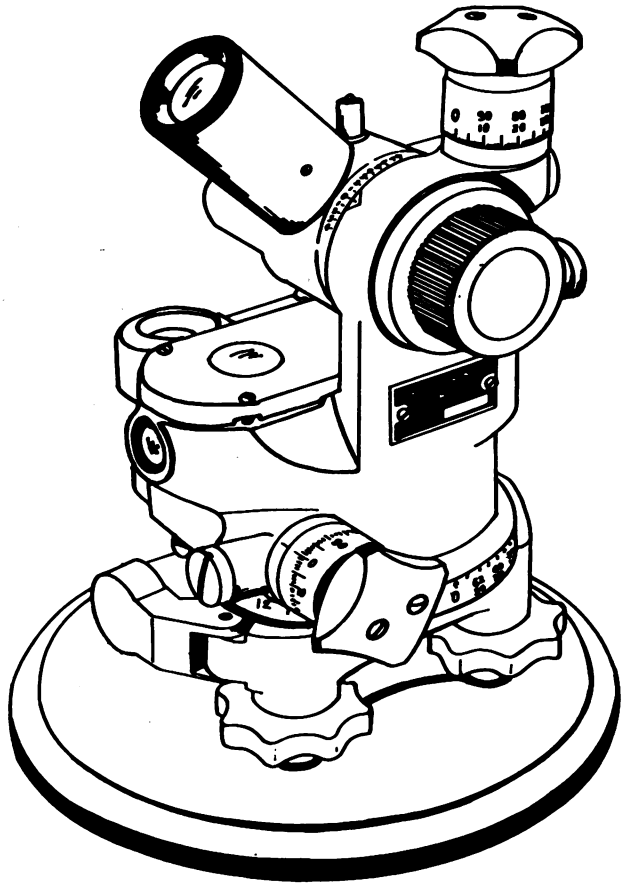

Figure 2.

TASK NUMBER: 071-11C-3926

REFERENCE:

FM 23-90, 81-mm Mortar

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TRAINING AND EVALUATION OUTLINE

TASK

BORESIGHT MORTAR FOR DEFLECTION USING THE M2 AIMING CIRCLE.

EVALUATION

CONDITIONS:

Given an M2 aiming circle, a mounted mortar complete with sight, and personnel to act as gunner.

STANDARDS:

Boresight the mortar for deflection to a 1 mil accuracy within 5 minutes.

TRAINING

1. Two methods of calibrating sight for deflection.

a. Calibration for deflection, using aiming circle (angle method) when boresight is not available.

(1) Set up the aiming circle 25 meters to the rear of the mounted mortar (800 mils elevation).

(2) With the azimuth scale and micrometer of the aiming circle at 0, aline the center of the reticle on the center of the baseplug of the mortar.

(3) Traverse and crosslevel the mortar until the center axis of the barrel from the baseplug to the muzzle is alined with the vertical line of the aiming circle telescope reticle (figure 1).

(4) Turn the deflection knob of the sight until the vertical line is centered on the lens of the aiming circle and read Angle A, opposite the fixed index (figure 1).

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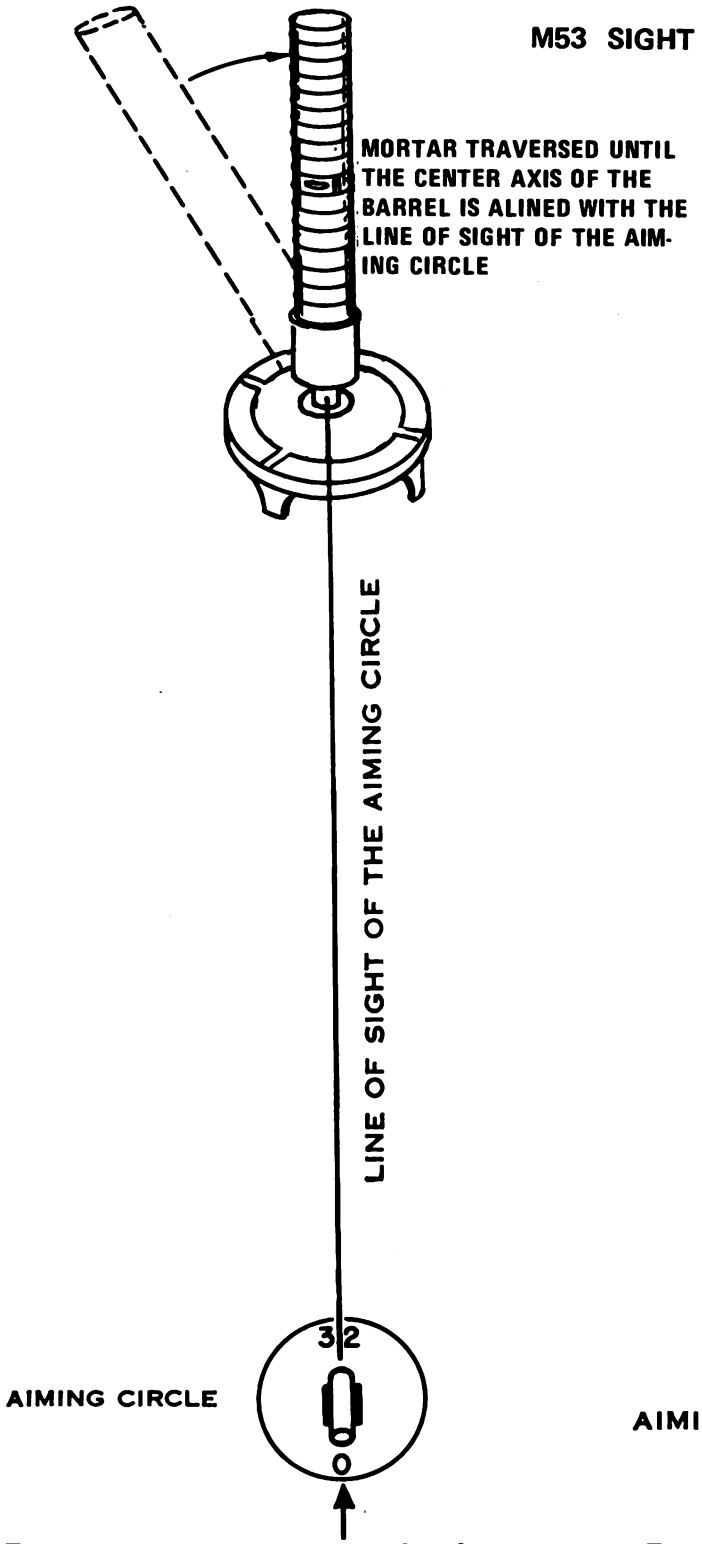
M53 SIGHT
MORTAR TRAVERSED UNTIL THE CENTER AXIS OF THE BARREL IS ALINED WITH THE LINE OF SIGHT OF THE AIMING CIRCLE
LINE OF SIGHT OF THE AIMING CIRCLE
AIMING CIRCLE
3
2
0

Figure 1. Alining mortar barrel with vertical line of aiming circle telescope reticle.

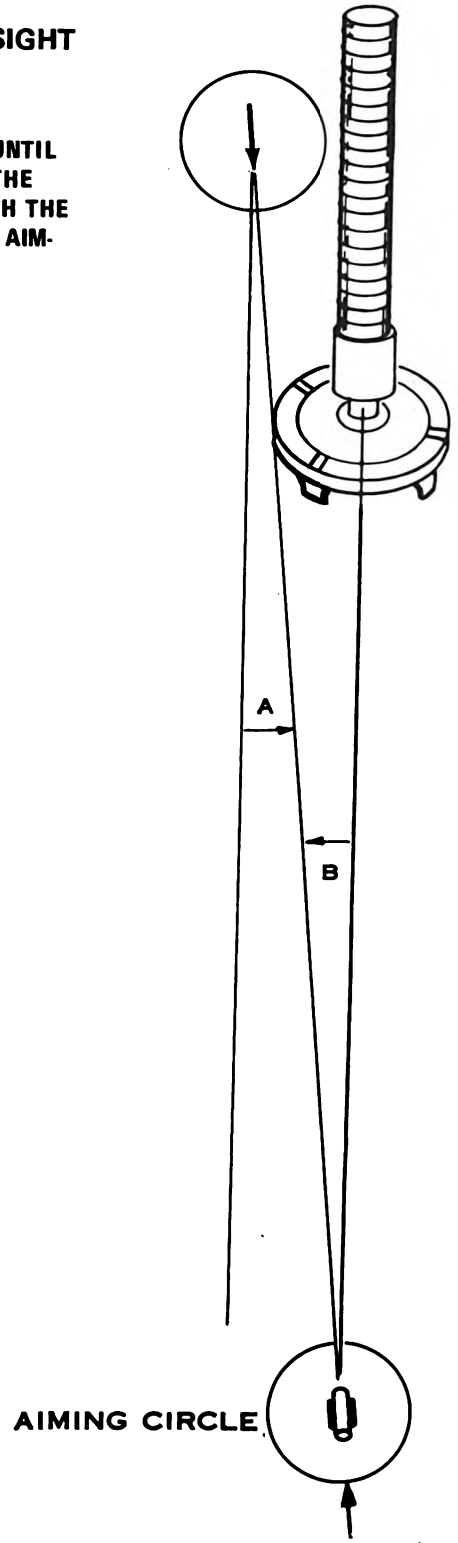

Figure 2. Determining angle A - Con't.

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(5) Turn the azimuth micrometer knob of the aiming circle until the vertical line of the telescope is laid on the center of the sight lens and read Angle B, opposite the azimuth scale index. If the sight is in calibration, angles will be equal. If they are not equal, the sight is adjusted as follows: Loosen the two boresight locking screws on the deflection knob and slip the micrometer deflection scale until the arrow on the index is alined with the zero mark on the micrometer scale.

2. Calibration for deflection, using the aiming circle when boresight is not available.

a. Set up the aiming circle and aline the vertical line on a distant aiming point (a sharp, distinct object not less than 200 meters distant).

b. Mount the mortar on level ground approximately 25 meters from the aiming circle and on the line between the aiming circle and the distant aiming point. Center the traversing bearing and crosslevel.

c. With the vertical line of the aiming circle still laid on the distant aiming point, move the mortar baseplate until the center of the baseplug is alined with the vertical line of the aiming circle. Traverse and crosslevel until the axis of the barrel, from baseplug to muzzle, is alined with the vertical line of the aiming circle.

d. Lay the vertical line of the sight unit on the same distant aiming point. If the sight is calibrated, the deflection reading will be 3200.

TASK NUMBER: 071-11C-3927

REFERENCE:

FM 23-90, 81-mm Mortar

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TASK

BORESIGHT MORTAR FOR ELEVATION USING THE M2 COMPASS

EVALUATION

CONDITIONS:

Given an M2 compass and mounted mortar complete with sight.

STANDARDS:

Boresight the mortar for elevation to a 1 mil accuracy within 5 minutes.

TRAINING

Calibration for elevation using the M2 compass when boresight is not available:

1. Mount the mortar on level ground and center the traversing bearing.
2. Elevate the barrel to an elevation of 800 mils.
   a. Set the elevation of 800 on the elevation scale in the M2 compass.
   b. Turn the compass on its left side as when reading angle of site and lay it on the top of the barrel.
   c. Elevate the mortar until the bubble is centered in the vial.
3. Crosslevel the mortar.
4. Center the elevation bubble by turning the elevation micrometer knob on the sight unit.

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5. If the reading of the elevation scale of the sight is not 800 mils, and the reading on the elevation micrometer is not 0, make adjustments for elevation on the elevation scale and micrometer knob.

TASK NUMBER: 071-11C-3928

REFERENCE:

FM 23-90, 81-mm Mortar

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TASK

PREPARE TARGET LISTS, FIRE PLANS, AND OVERLAYS

EVALUATION

CONDITIONS:

Given military map, company (battalion) sector, scheme of maneuver, overlay paper.

STANDARDS:

Within 1 hour, prepare a company (battalion) fire plan that reflects the following:

1. Target list:
   a. Target number.
   b. Target description.
   c. Target location.
   d. Target altitude (if known).
2. Target overlay.
   a. Friendly positions.
   b. Control measures.
   c. Target location and numbers.
3. Written portion:
   a. Instructions to clarify the fire plan.
   b. Special information.

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4. Fire plan tables:

a. Times for target engagement.

b. Expenditure of ammunition on each target.

c. Type of ammunition for each target.

d. On-call targets.

e. Time for opening fire.

f. Any special instructions.

TRAINING

1. The Company Fire Plan.

a. **Procedures.** Company fire planning is initiated by the company commander's announcement of his concept of fire support for his company's initial commitment into battle. The company fire planning team consists of the company commander, the company weapons platoon leader, the artillery FO, and the heavy mortar FO.

(1) The company commander gives the fire planning team a concept which briefly outlines his scheme of maneuver and his desires for fire support. Later, when the weapons platoon leader submits the proposed consolidated target list/company fire plan to him, he approves it or directs changes to it.

(2) The company weapons platoon leader supervises the preparation of the company mortar fire plan and coordinates the fire planning activities of the heavy mortar FO, and the artillery FO with those of the company. In coordination with the rifle platoon leaders, and based on the recommendations (target lists) of the 81-mm mortar FOs, he draws up the company fire plan (figure 1). He consolidates this with copies of the target lists prepared by the heavy mortar FO, and the artillery FO. He submits the consolidated lists to the company commander for approval.

(3) The artillery FO and the heavy mortar FO inform the supported company commander of the fire support available and get the following information from him:

(a) Location of forward elements.

(b) Scheme of maneuver.

(c) Known enemy location, avenues of approach, and assembly areas.

(d) Fires desired.

(e) The exact location of heavy mortar and artillery FPLs.

(f) Location of the command post.

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Upon receipt of this information, they start planning fires to support the company. Through map inspection, terrain analysis, and coordination with the weapons platoon leader of the supported company, the target lists are prepared. If time and facilities permit, an overlay giving a graphic representation may also be prepared (figure 2). The target lists include, for each target, map coordinates, description, and amplifying remarks if required. They do not include target altitudes. These are determined by the respective FDCs. When time is a limiting factor, target information may be submitted by telephone or radio directly to an FDC.

(4) The company weapons platoon leader assigns numbers to targets not included in the artillery and heavy mortar lists. Numbers from the separate target lists are transferred to the corresponding targets on the approved consolidated target list/company fire plan. Targets on the list are arranged by target number alphabetically and in numerical sequence.

b. **Distribution.** Once the fire plan is prepared, it is distributed to those who will need it, to include rifle platoon leaders, the mortar FOs, the FDC, the company fire planners, and the battalion S3. Coordinating with the company weapons platoon leader, the artillery FO and the heavy mortar FO prepare their target lists. Each gives a copy of this list to the company commander. In addition, the heavy mortar FO sends a copy of his target list to his FDC, and the artillery FO sends his list to the artillery fire support officer at battalion headquarters. The heavy mortar FDC and the artillery fire support officer assign numbers to targets on their respective lists and give this information back to their respective FOs.

2. Battalion Fire Support Plan.

a. Fire planning at battalion level is initiated on the same basis as that in the company. The battalion fire planning team consists of the battalion commander, the S3, the heavy mortar platoon leader, and the artillery fire support officer. As the heavy mortar platoon must always be directly responsive to the desires of the battalion commander, the platoon leader positions himself where he can best help the S3 plan and get fire support. The artillery fire support officer is normally the battalion FSCOORD, but in his absence, the heavy mortar platoon leader serves as such.

b. The battalion commander, assisted by the S3, presents the commander's concept of the operation which, as in the case of the company, includes the scheme of maneuver and the plan for fire support. After the FSCOORD has consolidated the target lists prepared by the heavy mortar FO and the artillery FO, the battalion commander approves the consolidated target list as part of the battalion fire support plans. This plan, when written out, becomes an annex to the operation plan.

c. The heavy mortar platoon leader coordinates and consolidates target lists prepared by the heavy mortar FO. He gives the list to the chief computer at the FDC. The chief computer has data computed to engage all targets within range. He eliminates duplications and safety hazards and insures that the most appropriate fires are planned. Target numbers are

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assigned, if not included already, and the altitude of all planned targets is determined. The product of this FDC procedure is the heavy mortar fire plan. It normally consists of an overlay (the graphic portion), a consolidated target list, and marginal data. There should be a copy for each FO, a copy for each organic and attached company, one for retention, and one copy to send to the FSCOORD for coordination and approval.

d. The artillery fire support officer is usually the battalion FSCOORD. He gets target lists from the artillery FO and from the heavy mortar FDC. Once duplications are eliminated, all fire plans are updated by assigning target numbers or by consolidating targets. After this is done, the FSCOORD submits all fire plans/target lists to the battalion S3 as the proposed battalion fire support plan.

e. The S3 sees that the proposed fire support plan does support the scheme of maneuver. After the fire plan is approved by the battalion commander, it becomes an annex to the battalion operation plan and is disseminated to all subordinate elements to include rifle companies and the heavy mortar platoon.

3. Company (Battalion) Fire Plan.

a. The **target list** includes all targets. It shows the target number, its description, location by coordinates, altitude, and pertinent remarks. The targets are listed alphabetically and in numerical sequence.

b. On the **target overlay** of the fire plan, symbols that indicate areas or targets on which fires have been planned and include graphic symbols representing control measures.

c. The **written portion** includes instructions to clarify the fire plan and any special information regarding mortar and field artillery fire in support of the battalion; for example, the tactical plan, priority of fires, and request for special missions.

d. The **fire plan table** allocates targets to firing units. In addition, it specifies --

(1) Times for the engagement of scheduled targets.

(2) The expenditure of ammunition by each fire unit on each target.

(3) The type of ammunition to fire at each target.

(4) On-call targets.

(5) The time for opening fire. The field artillery fire plan table may be fired on order, at a predetermined time, or when a specific event occurs.

(6) Any special instructions.

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COMPANY FIRE PLAN

(WPNS PLAT LDR TARGET LIST)

LN NO	TARGET NUMBER	DESCRIPTION	LOCATION	REMARKS
1		FPF	14898346	
2		Defensive Target	14948381	
3		Defensive Target	15488353	
4		Defensive Target	15008325	
5		Defensive Target	15528303	
6		OP	14218287	On Call
7		Hilltop	14848250	
8		OP	15108245	
9		Hill	15128286	
10		Enemy Position	16188288	On Call
11		Road Junction	14608190	On Call
12		Crossroads	15248171	
13		Road Junction	15638160	
14		Road Junction	16308183	On Call

Figure 1. Company (battalion) fire plan.

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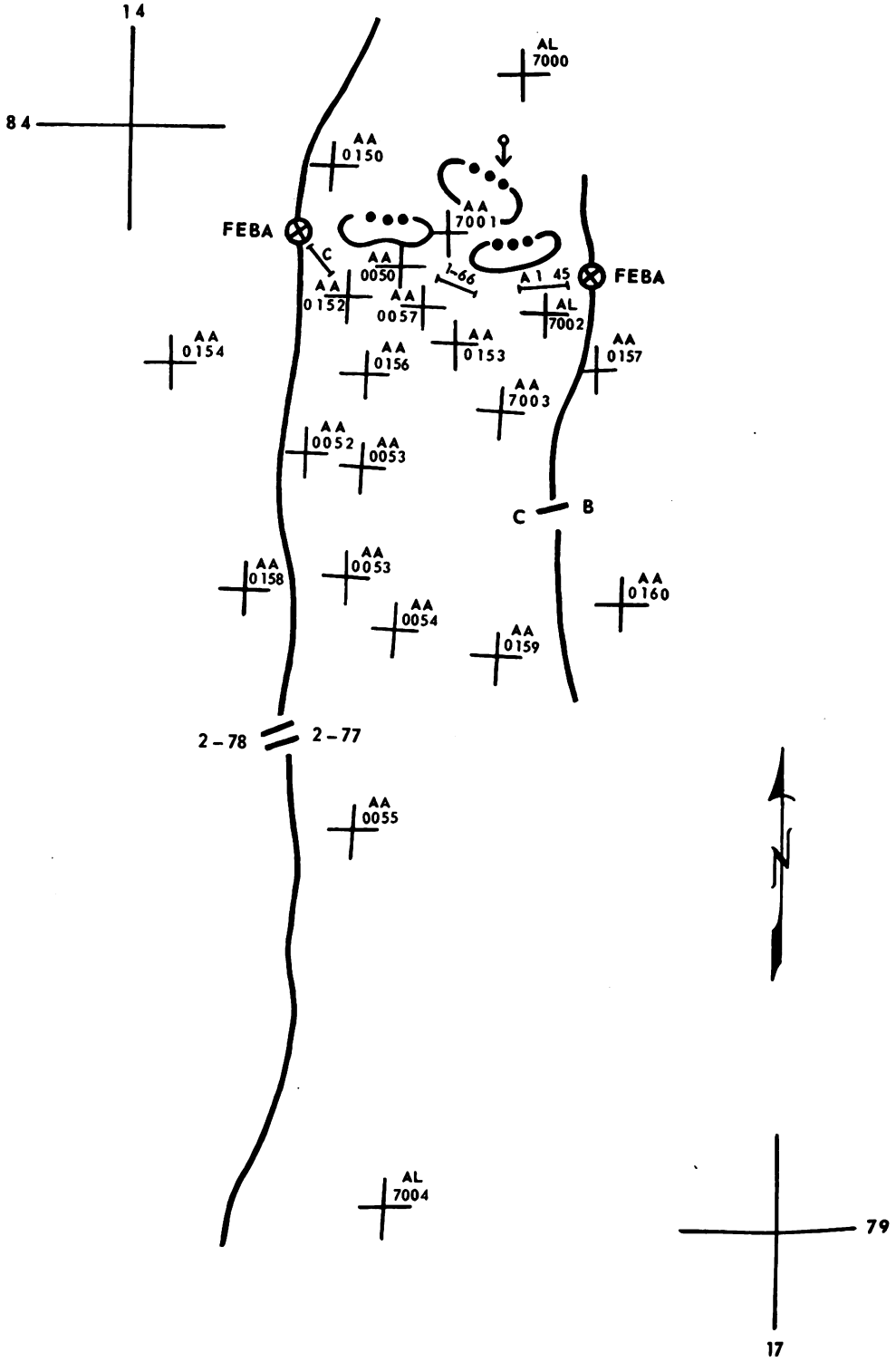

Figure 2. Company (battalion) fire plan overlay.

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4. Table of Groups of Targets. If groups of targets have been planned, a table of groups of targets is necessary. This table is to indicate targets within a group of targets to be fired simultaneously. Each target is normally assigned to a separate firing unit.

TASK NUMBER: 071-11C-1613

REFERENCE:

FM 23-91, Mortar Gunnery

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TRAINING AND EVALUATION OUTLINE

TASK

MAINTAIN ACCOUNTABILITY/REQUEST AMMUNITION.

EVALUATION

CONDITIONS:

Given an available supply rate, ammunition basic load, and an actual or simulated combat mission.

STANDARDS:

Maintain an acceptable level of ammunition on hand to facilitate any or all anticipated missions.

TRAINING

To maintain accountability/request ammunition, you must consider or perform the following:

1. Available supply rate (ASR).
2. Ammunition basic load.
3. Any or all anticipated missions to be fired and the type of ammunition for each mission.
4. Maintain the ammunition section of the computer's record.
5. Unit ammunition SOP.

TASK NUMBER: 071-11C-3929

REFERENCE:

None

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TRAINING AND EVALUATION OUTLINE

TASK

PREPARE THE RATER'S SECTION OF AN ENLISTED EVALUATION REPORT

EVALUATION

CONDITIONS:

Given DA Pamphlet 623-1, one blank DA Form 2166-5, and a number 2 lead pencil.

STANDARDS:

Complete parts II and III of the Enlisted Evaluation Report, DA Form 2166-5, as outlined in DA Pam 623-1 (Preparation of Enlisted Evaluation Reports).

TRAINING

1. Parts I and VII of the report will be completed by the Military Personnel Officer (MILPO). **Parts II and III are completed by you, the rater, and the indorser.** Part IV is completed by the indorser, and Part V is completed by the individual being rated.

NOTE: Part I should be checked by the rater and rated individual for possible discrepancies.

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2. Part II.

A. BRIEF DESCRIPTION OF DUTIES	Soldier performs duty as a member of the Indirect Fire Team. . Engages the enemy with mortar fires when required.

a. **Block A.** You will enter the actual duties performed by the rated soldier, including additional duties.

B. INDORSER HAS NOT OBSERVED AND CAN NOT RATE SOLDIER	☐

b. **Block B.** This block is not applicable to the rater. Will be completed by the indorser.

C. REPORT BASED ON:	DAILY CONTACT	FREQ OBSN		REPT & REC	
	■	☐	☐	☐	☐

c. **Block C.** Two selections are possible. Check the appropriate box to indicate frequency of contact, and if applicable, also check "reports and records". The rater will fill in the line following the "R" only.

D. SOLDIER SUPPORTS THE ARMY'S EQUAL OPPORTUNITY PROGRAM	YES	NO
	R ■	☐
	I ☐	☐

d. **Block D.** Mark the "yes" or "no" block as appropriate. A "no" response here requires explanation in Block J.

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e. Block E. Performance Traits. Rate the individual carefully on each of the ten performance traits by marking the appropriate box for each trait. Mark ratings in soft pencil, on the basis of the given rating scale. Enter the score for each trait in black ink in the score box at the right hand column under "R" and enter in the totals box at the bottom of the locations in Block H. Marking procedures are the same for Blocks F and G as in Block E, and the appropriate boxes in Block H. If the score for Block E exceeds 40 or is less than 10, justify in Block J.

E. DUTY PERFORMANCE TRAITS	RANKS WITH VERY BEST	SUPERIOR TO MOST		EXCEEDS OR MEETS DUTY REQUIREMENTS		NEEDS IMPROVEMENTS		SCORE	
						Some	Much		
		5	4	3	2	1	0	R	I
1. Is well informed on all phases of assigned duties. (Scope of knowledge about duties)	R I			■				3	
2. Carries out orders without constant supervision. (Dependability in performing without supervision)	R I			■				3	
3. Shows interest and enthusiasm for duties. (Attitude toward duties)	R I			■				3	
4. Demonstrates qualities of leadership. (Exerts positive influence on others)	R I			■				3	
5. Seeks out opportunities for self-improvement. (Effort directed toward realization of potential)	R I			■				3	
6. Displays ability to initiate action without direction from others. (Aggressive pursuit of methods to improve duty performance)	R I					■		1	
7. Is successful in working with others. (Ability to work in harmony with others)	R I			■				3	
8. Personal behavior sets a good example for others. (High standards of personal conduct)	R I			■				3	
9. Takes pride in dress and appearance. (Neat and military in bearing)	R I			■				3	
10. Is physically fit, as required, for MOS/grade during combat. (Physical condition)	R I		■					4	
							TOTALS	29	

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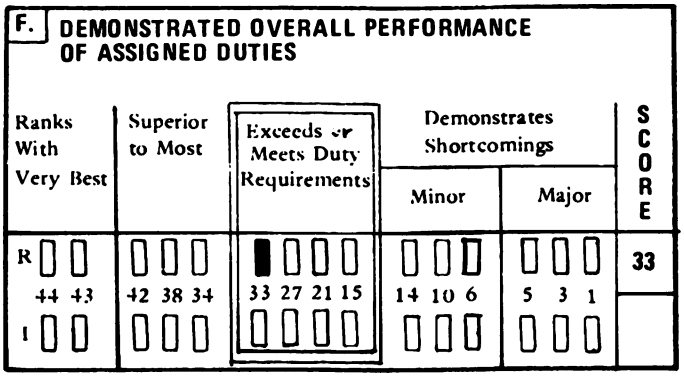
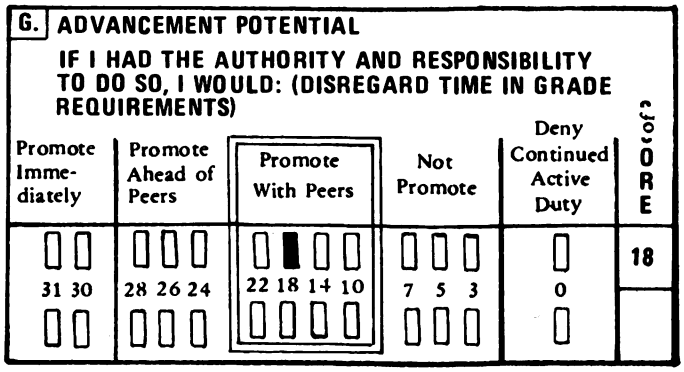
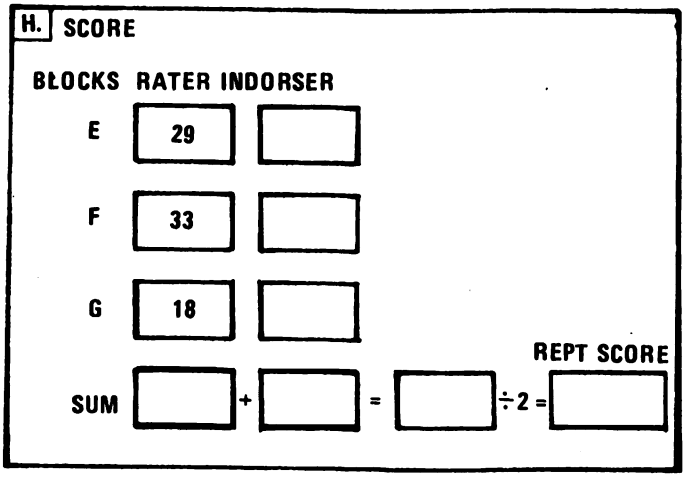


f. Block F. Demonstrated Overall Performance. In this section you rate the soldier's strengths and weaknesses, using overall performance. If score exceeds 42 or is below 6, justify in Block J.



g. Block G. Advancement Potential. Rate the soldier on ability to perform in the next higher grade by considering total capacity in comparison with other individuals of the same grade and length of service. If score exceeds or meets 22 or is below 10, justify in Block J.



h. Block H. Scores. You enter the scores from the appropriate boxes from Blocks E, F and G and total them. The sum of the scores is added by the indorser.

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i. Block I. Career Development. Recommendations for logical career development, such as advanced schooling and special assignments are appropriate here.

I. CAREER DEVELOPMENT (RECOMMENDATIONS ON SCHOOLING AND ASSIGNMENTS)
Recommend DA NCO Development Course for individual.

j. Block J. Comments. Comments must be either typed or neatly printed.

J. 1. COMMENTS ARE MANDATORY TO JUSTIFY RATINGS IN PART II AS FOLLOWS: a. BLOCK E SCORE BELOW 10 OR OVER 40, BLOCK F SCORE BELOW 6 OR OVER 42, BLOCK G SCORE BELOW 10 OR OVER 22, OR BLOCK D IF SOLDIER DOES NOT SUPPORT ARMY'S EQUAL OPPORTUNITY PROGRAM. b. INDORSER WHO CHECKS BLOCK II B. 2. REMARKS OTHERWISE OPTIONAL.
RATER

3. Part III. This entry, except for signature, must be typed or printed in black ink. Use black ink for signature.

PART III RATER AUTHENTICATION			
A. ORGANIZATION AND DUTY ASSIGNMENT Co C, 1st Bn, 26th Inf APO NY 09039	Section Leader	B. NAME AND GRADE CHARLIE A. DELTA E-6 D. SIGNATURE Charlie A. Delta	C. DATE 5 Jan76

4. Counseling. After signing the report, you should discuss the report with the rated soldier and counsel him. After counseling, you will forward the report to the indorser.

5. See figure 1 for a completed example of an Enlisted Evaluation Report, DA Form 2166-5, as filled in by the RATER.

TASK NUMBER: 071-11A-5310

REFERENCE:

DA Pamphlet 623-1, Preparation of Enlisted Evaluation Reports

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ENLISTED EVALUATION REPORT (AR 600-200)

For preparation, see DA Pamphlet 623-1.

C. SSN

PART I PERSONAL DATA

A. GRADE (ABBR) NAME (LAST) (FIRST) (MI) SSN

DOE, JOHN E. 000-00-0000

B. TYPE OF REPORT: INIT [ ] ANL [X] CR [ ] SP [ ] OTHER [ ] SPECIFY

D. ORGANIZATION AND STATION
Co C, 1st Bn, 26th Inf
APO NY 09039

E. PMOSC	F. DMOSC	G. SMOSC
11C10	11C10	11B10

H. PERIOD OF REPORT

BEGIN: MO. [JAN] YR [74]

END: MO. [DEC] YR [74]

I. NONRATED PERIOD
NO. OF MONTHS ____
REASON CODES ____

J. DUTY POSITION TITLE
Gunner
AUTH PAY GR E-4

PART II RATINGS

A. BRIEF DESCRIPTION OF DUTIES
Soldier performs duty as gunner in a weapons platoon. Engages enemy when required.

B. INDORSER HAS NOT OBSERVED AND CAN NOT RATE SOLDIER [ ]

C. REPORT BASED ON: DAILY CONTACT [X] FREQ OBSN [ ] REPT & REC [ ]

D. SOLDIER SUPPORTS THE ARMY'S EQUAL OPPORTUNITY PROGRAM: YES [X] NO [ ]

E. DUTY PERFORMANCE TRAITS

TRAITS (RANKS WITH VERY BEST)	SUPERIOR TO MOST 5	4	EXCEEDS OR MEETS DUTY REQUIREMENTS 3	2	NEEDS IMPROVEMENTS Some 1	Much 0	SCORE R	I
1. Is well informed on all phases of assigned duties. (Scope of knowledge about duties)			X				3	
2. Carries out orders without constant supervision. (Dependability in performing without supervision)			X				3	
3. Shows interest and enthusiasm for duties. (Attitude toward duties)			X				3	
4. Demonstrates qualities of leadership. (Exerts positive influence on others)			X				3	
5. Seeks out opportunities for self-improvement. (Effort directed toward realization of potential)			X				3	
6. Displays ability to initiate action without direction from others. (Aggressive pursuit of methods to improve duty performance)					X		1	
7. Is successful in working with others. (Ability to work in harmony with others)			X				3	
8. Personal behavior sets a good example for others. (High standards of personal conduct)			X				3	
9. Takes pride in dress and appearance. (Neat and military in bearing)			X				3	
10. Is physically fit, as required, for MOS/grade during combat. (Physical condition)		X					4	
TOTALS								

F. DEMONSTRATED OVERALL PERFORMANCE OF ASSIGNED DUTIES

Ranks With Very Best	Superior to Most	Exceeds or Meets Duty Requirements	Demonstrates Shortcomings: Minor	Demonstrates Shortcomings: Major	SCORE
R 44 43 / I	42 38 34	X 33 27 21 15	14 10 6	5 3 1	33

G. ADVANCEMENT POTENTIAL
IF I HAD THE AUTHORITY AND RESPONSIBILITY TO DO SO, I WOULD: (DISREGARD TIME IN GRADE REQUIREMENTS)

Promote Immediately	Promote Ahead of Peers	Promote With Peers	Not Promote	Deny Continued Active Duty	SCORE
31 30	28 26 24	X 22 18 14 10	7 5 3	0	18

H. SCORE

BLOCKS	RATER	INDORSER
E	29	
F	33	
G	18	
SUM		REPT SCORE

SUM ____ + ____ = ____ ÷ 2 = ____

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Figure 1. Con't.

RATED SOLDIER'S LAST NAME AND SSN

PART II CONTINUED

I. CAREER DEVELOPMENT (RECOMMENDATIONS ON SCHOOLING AND ASSIGNMENTS)

Recommend DA NCO Development Course for individual.

J. 1. COMMENTS ARE MANDATORY TO JUSTIFY RATINGS IN PART II AS FOLLOWS:
a. BLOCK E SCORE BELOW 10 OR OVER 40, BLOCK F SCORE BELOW 6 OR OVER 42, BLOCK G SCORE BELOW 10 OR OVER 22, OR BLOCK D IF SOLDIER DOES NOT SUPPORT ARMY'S EQUAL OPPORTUNITY PROGRAM.
b. INDORSER WHO CHECKS BLOCK II B.
2. REMARKS OTHERWISE OPTIONAL.

RATER

INDORSER

PART III RATER AUTHENTICATION

A. ORGANIZATION AND DUTY ASSIGNMENT	B. NAME AND GRADE	C. DATE
Co C, 1st Bn, 26th Inf APO NY 09039 Section Leader	CHARLIE A. DELTA	5 Jan76
	D. SIGNATURE: Charlie A. Delta	

PART IV INDORSER AUTHENTICATION

A. ORGANIZATION AND DUTY ASSIGNMENT	B. NAME AND GRADE	C. DATE
	D.	

PART V SOLDIER AUTHENTICATION

A. I HAVE SEEN A COPY OF THIS REPORT COMPLETE THROUGH ACTION BY THE INDORSER. I HAVE BEEN COUNSELED CONCERNING THE REPORT.	B. NAME AND GRADE	C. DATE
	D. SIGNATURE	

PART VI REVIEWER AUTHENTICATION

A. SOLDIER WAS RATED BY CORRECT RATER AND INDORSER. NO FURTHER ACTION REQUIRED. ☐
MY REVIEW RESULTS IN ACTION INDICATED BY INCLOSURES. ☐

B. ORGANIZATION AND DUTY ASSIGNMENT	C. NAME AND GRADE	D. DATE
	E. SIGNATURE	

PART VII MILPO CERTIFICATION

A. DATE REPORT ENTERED ON DA FM 2-1:	C.	D.
B. SOLDIER'S COPY: GIVEN TO SOLDIER ☐ FORWARDED TO SOLDIER ☐ MAILED TO SOLDIER ☐ CERTIFIED MAIL NO. _____	MILPO SIGNATURE	UIC

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TRAINING AND EVALUATION OUTLINE

TASK

PREPARE AND CONDUCT A PERFORMANCE-ORIENTED TRAINING SESSION (INDIVIDUAL AND COLLECTIVE).

EVALUATION

CONDITIONS:

Given: complete commander's guidance for preparation and conduct of a specific training session (individual or collective); an ARTEP applicable to your unit; Soldier's Manuals for the MOSs of your subordinates; FM 21-6, and access to your unit's training aids and devices, TEC equipment and training facilities/areas.

STANDARDS:

Within the time and resource limits given in the commander's guidance, conduct the training session so that each individual or element(s) can perform to the standards specified and under the conditions listed in the commander's training objective.

TRAINING

1. Overview. The preparation and conduct of performance-oriented training (be it individual or collective, equipment or tactically oriented) consists of the three-step backward planning process:

a. Describe the desired results of training.

b. Prepare to conduct training.

(1) Establish intermediate training objectives.

(2) Determine and organize training required.

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c. Conduct training to standards.

A more detailed discussion of these three steps is outlined below.

2. Describe the desired results of training. If you are given complete guidance by your commander, this step is done for you; if not, you will have to complete it so that it is satisfactory to your commander. To be complete, it must include the following:

a. WHAT SPECIFIC TRAINING OBJECTIVE DO YOU WANT ACCOMPLISHED? The training objective should include the task that the soldiers must be able to perform, the conditions under which the soldiers must perform the task, and the training standard which specifies the proficiency the soldiers must attain.

b. TO WHOM WILL THE TRAINING BE GIVEN? (e.g., 2 squads.)

c. WHEN WILL THE TRAINING TAKE PLACE? (e.g., 1300-1700 hours, 25 September, 3 weeks from now.)

d. WHERE WILL THE TRAINING TAKE PLACE? (e.g., Training Area K.)

e. WHY THE COMMANDER DECIDED TO CONDUCT THE TRAINING. What were his reasons for his decision?

3. Prepare to conduct training. This step is usually the most time consuming and difficult of the three steps. Do not take it lightly; however, if done properly it will insure the success of your training effort. It consists of the following:

PREPARE TO CONDUCT TRAINING

Establish Intermediate Training Objectives by:

Developing tasks required to accomplish the commander's training objective.

Establishing the conditions under which each task must be accomplished.

Establishing a training standard of performance for each task.

Determine and Organize Training Required by:

Determining which intermediate training objectives the soldiers cannot successfully perform without further training.

Organizing the intermediate training objectives into a progressive sequence (simple to complex) consistent with the available resources.

Estimating the training resources, trainer techniques, aids and devices needed to accomplish each objective.

Completing administrative requirements (e.g., obtaining equipment, writing the lesson plan, rehearsing training, etc.).

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There are several references and aids which can assist you in accomplishing this step.

a. **FM 21-6, How to Prepare and Conduct Military Training,** provides detailed discussion on the preparation and conduct of training.

b. The **ARTEP** for your unit lists training objectives for most of the collective tasks you will be concerned with.

c. **Soldier's Manuals** lists training objectives and intermediate training objectives for individuals for most of the training (both individual and collective) you will encounter. In addition they provide training tips which can assist you in your preparation.

d. **Training Extension Courses (TEC lessons)** develop (or will in the future) most of your intermediate training objectives into pre-packaged lessons. In some cases they are hands-on, in others, you must complete the training by providing the performance practice and evaluation. In addition, the pre-test for each lesson can help you identify which intermediate training objectives require (or do not require) training.

4. Conduct training to standards. The basics of the conduct of training are presented in the TASK: **Conduct a performance-oriented training session.** Now, however, your performance of this step may involve a series of presentations of intermediate training objectives. In somecases, when collective training is involved, you will find the use of multi-echelon training to be an efficient method of training. Despite the different name, remember one thing, the basics still apply. You might require assistant trainers (other squad leaders, for example) but the process of conducting training used by each remains the same:

a. explain and demonstrate.

b. soldiers/teams/squad practice.

c. test.

In doing all of these, and, in fact, throughout your preparation, remember the key to success is a good training objective.

TASK NUMBER: 071-11A-5102

REFERENCES:

FM 21-6, How to Prepare and Conduct Military Training
TEC Lessons, 901-071-0091-F through 0097-F (Now under development.)

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FM 7-11B3	( )	FM 7-11C3	( )
FM 7-11B4	( )	FM 7-11C4	( )
FM 7-11B5	( )		

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FM 7-11C3

30 JULY 1976

By Order of the Secretary of the Army:

FRED C. WEYAND
General, United States Army
Chief of Staff

Official:

PAUL T. SMITH
Major General, United States Army
The Adjutant General

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